ISSN: 0952–7583

British Journal of ENTOMOLOGY and Natural History

Volume 21
2008

Published by the British
Entomological and Natural History
Society and incorporating its
Proceedings and Transactions

British Journal of Entomology and Natural History is published by
The British Entomological & Natural History Society
Dinton Pastures Country Park, Davis Street, Hurst, Reading, Berkshire RG10 0TH, UK.
Tel: 01189-321402. The Journal is distributed free to BENHS members.

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Registered charity number: 213149

Printed in the United Kingdom by Henry Ling Limited
at the Dorset Press, Dorchester, DT1 1HD.

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY

Index to Volume 21, 2008

Compiled by D. A. Young and R. D. Hawkins with the assistance of P. J. Chandler, A. J. Halstead, N. M. Hall, P. J. Hodge and A.W. Jones

Dates of publication:

Part 1 – March 2008
Part 2 – June 2008
Part 3 – September 2008
Part 4 – December 2008

Plates:

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December 2008 ISSN 0952-7583 Vol. 21, Part 4

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY

BRITISH ENTOMOLOGICAL & NATURAL HISTORY SOCIETY

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Typeset by Tavistock Digital Data, Tavistock, Devon.
Printed in England by Henry Ling Ltd, Dorchester, Dorset.

BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY
Registered charity number: 213149

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Cover photograph: The leafhopper *Evacanthus interruptus* (L.), Llandrindod, Powys, 13.vii.2008 (Photo: Joe Botting).

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FACTORS AFFECTING THE PRESENCE OF INSECTS ON A SMALL UN-VEGETATED BANK AT AN ABANDONED MINING SITE IN WEST CORNWALL

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ABSTRACT

Abandoned metalliferous mine sites are important for wildlife. One such site, called Binner Downs in Cornwall, was surveyed for insects in 1994 and 1995, with 103 species recorded in three visits, each of one hour duration. One of the most important areas for invertebrate activity was a small south-facing sandy bank, which was re-surveyed for insects in 2003 and 2007. The bank was used by a range of insects including the bee *Panurgus banksianus* (Kirby) and the tiger beetle *Cicindela campestris* L. for nesting. Insects such as the ground-hopper *Tetrix undulata* (Sowerby) fed on the sparse vegetation, whilst the muscid *Neomyia cornicina* (Fabr.) utilised the bank for thermo-regulation and the bee *Nomada fabriciana* (L.) for host location. The soils here showed consistently high levels of arsenic, copper, lead and zinc, but metal contamination was generally lower than in the surrounding, more heavily vegetated areas. Particle size analysis indicated that the aculeates *Panurgus banksianus*, *Andrena dorsata* (Kirby), *Cerceris arenaria* (L.) and *Mellinus arvensis* (L.) all nested where the soils were very fine, with 84% of the particles less than 250μm. Temperatures on the bank from June to September 2007 ranged from 4.1°C–40.1°C (mean 17.4°C), compared to the cooler ground temperatures obtaining in the adjacent scrubby areas of 5.6°C–19.6°C (mean 13.5°C). Compared to the surrounding areas, the fine sands, lower levels of metal contamination and high temperatures all contributed to making the bank suitable for a wide range of insects.

INTRODUCTION

Binner Downs (SW614341) is an abandoned metalliferous site covering approx. 9.3 hectares near the village of Leedstown in west Cornwall (Fig. 1). Copper mining began here over 250 years ago and continued until 1838. Tin as a by-product was at first discarded on dumps and then reworked on the surface sometime after 1838 as the value of tin increased. The site is unusual in that there are few old mine buildings present but numerous mine shafts honeycomb below the ground. The ground has been reworked several times and there has been considerable disturbance, e.g. by travellers camping on the site, by shaft-capping to make the site safe for visitors, and by re-vegetation of some of the bare ground areas. The old Cornish mine sites are known to be important for wildlife (e.g. Johnson, Payton & Spalding, 1996; Spalding & Dinsdale, 2000) and insects in particular (Haes & Spalding, 1996; Spalding, 1996, 2005), especially because of the presence of heathland and abundant bare ground. This site was one of a suite of 12 Cornish abandoned mine sites surveyed for their insect interest in 1994 and 1995. Simultaneously, soil samples were taken from these sites and analysed for metal contamination at Camborne School of Mines (unpublished data); the results for Binner Downs showed high levels of contamination with copper, tin, lead, zinc and especially arsenic.

Fig. 1. A general view of Binner Downs, Cornwall, showing capped mine shaft and heathland areas of value to invertebrates, 2008. Photo: Mark Spalding-Jenkin.

One of the key areas for insects was a small, largely un-vegetated bank near the northern edge of the site, surrounded by ling *Calluna vulgaris* (L.) Hull and European gorse *Ulex europaeus* L. This area was surveyed in the summer of 2003 and again in 2007. Some of the key factors affecting the presence of insects here are likely to be the suitability of the substrate for excavating nest holes, the absence of vegetation (possibly due to the presence of metal contamination) and the high ground temperatures on the sheltered south-facing slopes. These factors were examined by particle size analysis of soil samples from the site, testing soil samples for metal contamination in vegetated and non-vegetated areas, and taking temperature readings using dataloggers. In 2005, Binner Downs became under threat as a possible site for an official travellers' camp and these surveys contributed to the defence of this site from this threat.

Methods

The whole site was surveyed on 11.viii.1994, 24.iv.1995 and 21.vi.1995 for 30 minutes per person (equating to 1 man hour per site visit) as part of a standard survey system allowing comparison between this site and 11 other mine sites in Cornwall (unpublished data). Standard survey methods were used, including sweeping vegetation, netting flying insects and searching vegetation, on bare ground and under stones. Only those species considered to be associated with the site were recorded, e.g. species seen feeding on nectar, actively predating or known predators, or observed nesting.

The second survey was restricted to a small south-facing bank about 4 metres wide by 8 metres long and 1.3 metres high. The flat area on top consisted of about 50% bare ground, with 30% dwarf *C. vulgaris*, 15% moss (*Pleuridium acuminatum* Lindb. and *Hypnum cupressiforme* Hedw.) and a small amount of the grass *Agrostis capillaris* L. The slope was about 20°–30°, consisting almost entirely of bare ground but with occasional dwarf *Calluna*. The surrounding areas were clothed in dense *U. europaeus* and *Calluna* scrub. Brief surveys of about 15-30 minutes duration were undertaken through the summer months in 2003 and again in 2007. Only those insects associated with the bank itself were recorded, i.e. species feeding, nesting or basking on the slope.

In addition, soil samples to a depth of 4.5cm were taken on 10.iii.2007 from two areas on the bank and two control areas:

- Sample 1: Un-vegetated soil on the bank top from areas used by ground-nesting aculeates (taken from where *Panurgus banksianus* (Kirby) and *Mellinus arvensis* (L.) were seen nesting).
- Sample 2: Un-vegetated soil on the south-facing slope.
- Sample 3: Densely vegetated soil from an area adjacent to the bank with *Ulex* and *Calluna*.
- Sample 4: Densely vegetated soil from an area adjacent to the bank with the mosses *P. acuminatum* and *H. cupressiforme*.

The soils were analysed for metal contamination and pH values.

A single soil sample was also collected and analysed for particle size from the area used by the ground-nesting aculeates *M. arvensis* and *P. banksianus* on the bank top. Only one sample was taken here as the method is very destructive; too much soil is required to take a sample from each nesting hole. The soil was dried, placed in a sieve tower (the finest sieve at the bottom) and sieved on a shaker for two minutes. Each sub-sample was weighed and the percentage of the total sample calculated. No soils were analysed from the slopes as at that time no nesting holes were seen here.

Principal component and cluster analysis of the soils were carried out using Primer (Clarke & Gorley, 2006). Similarity was calculated using a square root transformation followed by a Bray Curtis similarity measure.

In addition, a single TinyTag TGX-3080 data logger (manufactured by Gemini Dataloggers) was placed 1cm under the ground on the un-vegetated south-facing slope of the bank throughout the summer (13.v. 2007–28.x.2007) to measure temperatures at 4 hour intervals. Temperatures were also measured at a control site below dense *Ulex* for the autumn only, between 4.viii.2007 and 28.x.2007.

The original surveys in 1994 and 1995 were carried out by AS and ECMH; for these surveys, species identifications were made by ECMH and AS. Mike Edwards identified the aculeates. Field surveys in 2003 and 2007 were carried out by AS and GAC; difficult species were identified by GAC. Soil samples were collected by AS and analysed by Ian Farmer Associates. Temperature and particle size analysis was carried out by AS.

Results

The 1994–1995 survey

One hundred and three insect species were recorded from Binner Downs (Appendix 1), including four Nationally Scarce species (Table 1). Twenty three of

Table 1. Nationally scarce species at Binner Downs, west Cornwall 1994–1995

Species name	Order, Family	Status	Habitat association
Bombylius canescens Mikan	Diptera, Bombyliidae	Nb	Warm sites; cleptoparasite in nests of mining bees
Ectobius panzeri Stephens	Dictyoptera, Blattellidae	Nb	Heather; warm sites
Plebejus argus (L.)	Lepidoptera, Lycaenidae	Nb	Ants; bare ground
Methocha articulata Latreille	Hymenoptera, Tiphiidae	Nb	Parasitoid of larvae of tiger beetles nesting in bare ground

these species are especially associated with heathland and bare ground sites. Other species were generalists, using the site for collecting nectar, basking or predating.

A single Silver-studded Blue *Plebejus argus* (L.) was recorded. This species has not been seen here since and may no longer occur on the site.

Both the bee-fly *Bombylius canescens* Mikan and the wasp *Methocha articulata* Latreille were associated with the small bank that formed the site for the second survey. There were also large numbers of *P. banksianus*, with over 209 counted during a single visit.

The small bank (2003 and 2007)

Twenty four species were recorded on the small bank (Table 2), including six species recorded nesting in the ground, three species associated with *Calluna*, three species basking in the sun and several species searching for prey. There were large aggregations of *P. banksianus* and the crabronid *Cerceris arenaria* (L.).

The soils showed consistently high levels of arsenic, copper, lead and zinc, with pH values ranging from 5.4 to 6.1 (Table 3). Sample site 1 (the bank top) showed generally lower levels of metal contamination, and higher pH values, than the other three sampled sites. Principal component analysis indicated that lead, copper and arsenic were important factors in differentiating between samples. Samples S2–S4 were clustered with a similarity coefficient value of 94% whereas S1 only had a similarity of 87% relative to this cluster (Fig. 2).

The grass *Agrostis capillaris* was restricted to the flat bank top. The Mottled Grasshopper *Myrmeleotettix maculatus* (Thunberg) was also restricted to this area, where the short turf amidst abundant well-drained bare ground provided suitable habitat (Marshall & Haes, 1988).

Particle size analysis indicated that the soils where the aculeates nested were very fine, with 84% of the particles less than 250µm (Fig. 3). *Panurgus banksianus* was abundant at this site; the aculeates *Andrena dorsata* (Kirby), *Cerceris arenaria* and *M. arvensis* and the tiger beetle *Cicindela campestris* L. (adults and larvae) were also present here in low numbers.

Temperatures on the bank from June to September 2007 ranged from 4.1°C–40.1°C (mean 17.4 C), compared to the cooler ground temperatures in the adjacent areas of *Ulex* and *Calluna* of 5.6°C–19.6°C (mean 13.5°C) (Table 4, Fig. 4). The difference was especially marked in the higher temperatures ranges; for example on 25 August 2007 temperatures on the bank reached 40.1°C at 15.00h, whereas the ground temperature under the gorse at this time was 19.3°C.

Table 2: Species associated with the small bank at Binner Downs 2003, 2007

Order	Species	Family	Association with bank
Orthoptera	*Tetrix undulata* (Sowerby)	Tetrigidae	Feeding on moss growing on the bank
	Myrmeleotettix maculatus (Thunberg)	Acrididae	Feeding on low-growing *Agrostis* growing on the bank
Hemiptera	*Philaenus spumarius* (L.)	Cercopidae	Feeding on *Calluna*
	Ulopa reticulata (Fabr.)	Cicadellidae	Feeding on *Calluna*
Coleoptera	*Cicindela campestris* L.	Carabidae	Larvae in burrows; adults thermo-regulating
	Bembidion quadrimaculatum (L.)	Carabidae	Searching for prey? Running across slope
	Amara plebeja (Gyllenhal)	Carabidae	Running across slope
	Neliocarus nebulosus (Stephens)	Curculionidae	On soil
Lepidoptera	*Gymnoscelis rufifasciata* (Haworth)	Geometridae	Larva feeding on *Calluna* growing on the bank
Diptera	*Bombylius canescens* Mikan	Bombyliidae	Searching for host nests (*Panurgus banksianus*)
	Leucophora grisella Hennig	Anthomyiidae	Cleptoparasite of ground-nesting aculeates
	Neomyia cornicina (Fabr.)	Muscidae	Basking on soil
	Metopia indet. ♀	Sarcophagidae	Basking on soil; a cleptoparasite on ground-nesting aculeates
Hymenoptera	*Methocha articulata* Latreille	Tiphiidae	Searching for host burrows
	Lasius niger (L.)	Formicidae	Nesting
	Mellinus arvensis (L.)	Crabronidae	Several nesting
	Cerceris arenaria (L.)	Crabronidae	15–20 seen nesting; also mating on site
	Andrena cineraria (L.)	Apidae, Andreninae	On ground
	Andrena dorsata (Kirby)	Apidae, Andreninae	Nesting
	Panurgus banksianus (Kirby)	Apidae, Andreninae	Large numbers nesting
	Lasioglossum punctatissimum (Schenck)	Apidae, Halictinae	On ground
	Nomada fabriciana (L.)	Apidae, Apinae	Searching on ground for host nests
	Nomada leucophthalma (Kirby)	Apidae, Apinae	Searching on ground for host nests
	Bombus pascuorum (Scopoli)	Apidae, Apinae	Investigating hole in bank

Table 3 Metal content (ppm) and pH values at four sample sites, Binner Downs, 2007

Analysis	Sample 1 – bank top	Sample 2 – bank slope	Sample 3 – gorse scrub	Sample 4 – mossy area
Arsenic (total)	1300	1500	2000	1800
Cadmium (total)	1.5	2.0	2.0	1.9
Chromium (total)	22	24	23	30
Lead (total)	460	1300	1300	1100
Mercury (total)	<1.0	<1.0	<1.0	<1.0
Selenium (total)	<1.2	<1.2	<1.2	<1.2
Copper (total)	450	890	780	540
Nickel (total)	28	45	45	44
Zinc (total)	120	330	150	140
(w/s) sulphate as SO_4	160	68	82	50
pH	6.1	5.4	5.6	5.6

Discussion

A range of factors has been shown to influence the wildlife of mine sites, including compaction of the substrate, steep slopes, low nutrient status, toxic elements, the absence of soil micro-organisms and extremes of surface temperature (Bradshaw & Chadwick, 1980). Some of these factors apply here.

The small bank, the focus of the study, provides an important insect resource within the larger area of Binner Downs, with 23% of the total number of species being found here, including two of the four nationally scarce species. The site is especially valuable as it provides an un-vegetated hot slope for basking insects, where temperatures reached $>40°C$ in high summer. For at least some species of

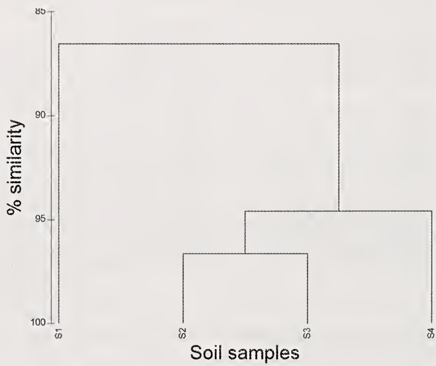

Fig 2. Cluster analysis showing the separation of samples by metal contamination (S1 = un-vegetated bank top; S2 = un-vegetated bank slope; S3 = *Ulex* and *Calluna* vegetated soil; S4 = mossy soil).

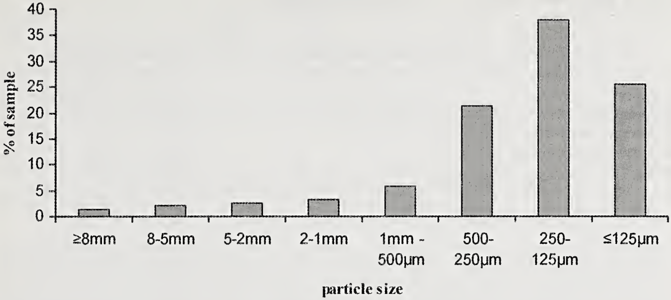

Fig 3. Particle size analysis of soil adjacent to aculeate nesting holes at Binner Downs, 2006

Hymenoptera, warmer sites are more likely to be favoured by nest-searching females, with larger founding broods and earlier brood production (e.g. Jeanne & Morgan, 1992). Potts and Willmer (1997) for example found a significant correlation between nest sites and aspect for the ground-nesting bee *Halictus rubicundus* (Christ) (not recorded at Binner Downs), and to a lesser extent with steepness of slope, both factors having a direct effect on ground temperatures.

The sandy soil provides a suitable substrate for ground-nesting aculeates. The softness of the soil is likely to be a factor here. For example the crabronid *Cerceris antipodes* Smith has been shown to search out softer soils (McCorquodale, 1989) and will start new nests when soil softness (as measured by a penetrometer) is greatest,

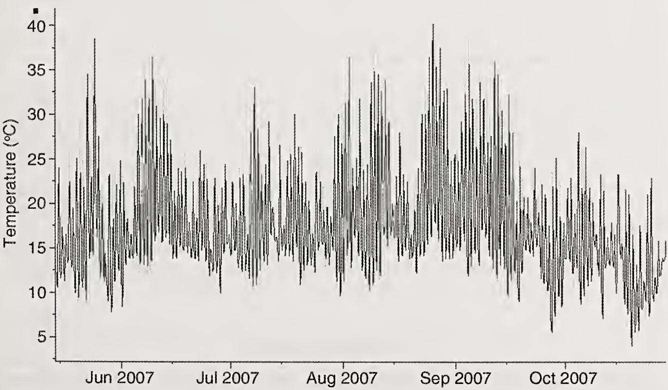

Fig. 4. Ground temperatures on the un-vegetated bank at Binner Downs summer 2007

Table 4 Temperature readings at Binner Downs, summer 2007

	2007	
	Unvegetated bank	*Ulex europaeus* area
Duration	13.v 2007–28.x.2007	4.viii.2007–28.x.2007
Readings (n)	1008	511
Minimum temperature °C	4.1	5.6
Maximum temperature °C	40.1	19.6
Mean °C	17.4	13.5

e.g. after rain. Other insects may select habitats with fine-grained in preference to coarse-grained soils, e.g. larvae of the ant-lion *Myrmeleon crudelis* Walker in Costa Rica (Farji-Brener, 2003). Particle size and geological strata are important elements in nesting site selection by ground-nesting aculeates; Mader (1999) provides a range of particle sizes for nesting sites for *Colletes* species in sandstones in Germany. Potts and Willmer (1997) found that the maximum density of *Halictus rubicundus* nests at Invergowrie was associated with the sandiest soils. They divided their soil samples into gravel (>2mm in diameter), sand (250μm–2mm), silt (63–250μm) and clay (<63μm) and found that for *H. rubicundus* across a range of ten British sites all typically had silt and clay of <5% by weight, gravel <65% and sand between 35 and 100%. At Binner Downs a finer substrate has been selected for nesting, more akin to silt than sand, and may be the result of a general lack of suitable nesting sites across the mine site.

Only one soil sample was taken for particle size analysis. As a result, it was not possible to measure any differences between nesting sites chosen by different species. Sieving is unsuitable for fine-scale work. Alternative methods, such as measuring individual sand grains using modern computer imaging techniques, may allow analysis of sand particles around individual nest sites.

The particle size of the slope soils was not analysed but the substrate there was more compacted with many large stones forming an unstable clitter unsuitable for nesting by burrowing species. Fewer species were found here than on the bank top (sample S1). However, both *Cerceris arenaria* and *Cicindela campestris* nested on the slope where metal contamination was higher (sample S2).

Metal contamination at the levels recorded appeared not to influence the presence of vegetation. Site S1 had the lowest metal contamination and remains largely unvegetated, although there was some evidence of colonisation by *Calluna* over recent years. There appears to be little difference in metal content between the non-vegetated bank (S2) and sites S3 and S4, where there was no bare ground, although S2 had the highest levels of copper and zinc. It is beyond the scope of this article to discuss responses of vegetation to metal contamination. However, it is a characteristic of mine sites that contamination tends to be variable, forming "hotspots" with high metal content amidst areas of low contamination; further sampling would be necessary to give certainty to the results.

Acknowledgements

The authors are grateful to Mike Edwards for identifying aculeates for AS and ECMH in 1994 and 1995, to Sarah Corbett for finding and supplying the Mader reference and to Jeremy Field for pointing out various other references.

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Appendix 1: Insects recorded at Binner Downs 1994–2007

Orthoptera

Leptophyes punctatissima (Bosc), *Tetrix undulata* (Sowerby), *Chorthippus brunneus* (Thunberg), *Chorthippus parallelus* (Zetterstedt), *Myrmeleotettix maculatus* (Thunberg).

Dermaptera

Forficula auricularia L.

Dictyoptera

Ectobius panzeri Stephens.

Hemiptera

Saldula saltatoria (L.), *Nabis ericetorum* Scholtz, *Nabis rugosus* (L.), *Anthocoris nemorum* (L.), *Coreus marginatus* (L.), *Alydus calcaratus* (L.), *Chorosoma schillingi* (Schummel), *Myrmus miriformis* (Fallén), *Eysarcoris fabricii* (Kirkaldy), *Palomena prasina* (L.), *Piezodorus lituratus* (Fabr.), *Philaenus spumarius* (L.), *Ulopa reticulata* (Fabr.), *Cicadella viridis* (L.), *Eupelix cuspidata* (Fabr.).

Neuroptera
Chrysoperla carnea agg.

Coleoptera
Cicindela campestris L., *Bembidion quadrimaculatum* (L.), *Amara plebeja* (Gyllenhal), *Athous haemorrhoidalis* (Fabr.), *Cantharis rustica* Fallén, *Rhagonycha fulva* (Scopoli), *Coccinella septempunctata* L., *Lagria hirta* (L.), *Oedemera nobilis* (Scopoli), *Oedemera lurida* (Marsham), *Clytus arietis* (L.), *Lochmaea suturalis* (Thomson), *Exapion ulicis* (Forster), *Cionus scrophulariae* (L.), *Neliocarus nebulosus* (Stephens).

Mecoptera
Panorpa communis L.

Lepidoptera
Zygaena filipendulae stephensi Dupont, *Plutella xylostella* (L.), *Coleophora alticolella* Zeller, *Eupoecilia angustana* (Hübner), *Cydia ulicetana* (Haworth), *Alucita hexadactyla* L., *Agriphila straminella* ([Denis & Schiff.]), *Agriphila tristella* ([Denis & Schiff.]), *Agriphila geniculea* (Haworth,), *Nomophila noctuella* ([Denis & Schiff.]), *Thymelicus sylvestris* (Poda), *Ochlodes sylvanus* Esper, *Pieris brassicae* (L.), *Pieris rapae* (L.), *Lycaena phlaeas eleus* (Fabr.), *Plebejus argus argus* (L.), *Polyommatus icarus icarus* (Rottemburg), *Aglais urticae* (L.), *Hipparchia semele semele* (L.), *Pyronia tithonus britanniae* Verity, *Maniola jurtina insularis* Thompson, *Coenonympha pamphilus* (L.), *Scopula marginepunctata* (Goeze), *Gymnoscelis rufifasciata* (Haworth), *Ematurga atomaria (*L.), *Lycophotia porphyrea* ([Denis & Schiff.]), *Anarta myrtilli* (L.), *Autographa gamma* (L.).

Diptera
Bombylius canescens Mikan, *Melanostoma mellinum* (L.), *Episyrphus balteatus* (Degeer), *Eupeodes corollae* (Fabr.), *Neoascia podagrica* (Fabr.), *Eristalis arbustorum* (L.*), Eristalis tenax* (L.), *Helophilus pendulus* (L.), *Syritta pipiens* (L.), *Leucophora grisella* Hennig, *Neomyia cornicina* (Fabr.)*), Metopia* indet. female, *Dexia rustica* (Fabr.), *Tachina fera* (L.), *Tachina grossa* (L.).

Hymenoptera
Methocha articulata Latreille, *Lasius alienus* (Förster), *L. flavus* (Fabr.), *L. niger* (L.), *Myrmica scabrinodis* Nylander, *Vespula vulgaris* (L.), *Ammophila sabulosa* (L.), *Mellinus arvensis* (L.), *Cerceris arenaria* (L.), *Colletes succinctus* (L.)*, Andrena carantonica* Pérez, *A. cineraria* (L.), *A. fuscipes* (Kirby), *A. haemorrhoa (*Fabr.), *A. dorsata* (Kirby), *A. ovatula* (Kirby), *A. wilkella* (Kirby), *Panurgus banksianus* (Kirby), *P. calcaratus* (Scopoli), *Lasioglossum calceatum* (Scopoli), *L. punctatissimum* (Schenck), *Sphecodes ephippius* (L.), *Nomada fabriciana* (L.), *N. leucophthalma* (Kirby), *N. rufipes* Fabr., *Bombus lucorum* (L.), *B. terrestris* (L.), *B. hortorum* (L.)*, B. lapidarius* (L.), *B. (Psithyrus) campestris* (Panzer), *B. jonellus* (Kirby), *B. pratorum* (L.), *B. pascuorum* (Scopoli), *Apis mellifera* L.

THE INVERTEBRATES OF TWO WATER MEADOWS ON THE RIVER AVON, WILTSHIRE

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Abstract

Terrestrial and aquatic invertebrates were surveyed at two traditionally managed water meadows on the River Avon. Of the 441 species recorded at Lower Woodford and 390 species at Britford, about 60% were wetland species but just less than 5% of the totals were species of conservation concern, and few of these were widespread on the sites. A comparison of gutters supplying water intermittently to the meadow and the mainly permanently wet drains showed that many widespread wetland species were confined to the drains, whereas no widespread species was confined to the gutters. It was concluded that traditional water-meadow management did not contribute to the conservation interest of the invertebrate fauna at these two sites.

Introduction

Water meadows are pasture that is gently flooded ('drowned') during spring and summer using river-water in order to increase its productivity through better irrigation, addition of nutrients and raising the ground temperature in spring. The method became widespread in England in 17th century but has long ceased as an economically viable operation. Flooding is highly controlled so that only a thin film of moving water flows from gutters supplying the water across gently sloping ground to receiving drains. The resulting system may appear to be a useful conservation resource for wetland species since it represents a type of temporary water, many of which are currently recognised as having high conservation value (Bratton, 1990; Williams, 2006). However, there appears to have been more speculation than fact behind the perceived value of traditional management of water meadows for nature conservation (Everard, 2005). Sheppard (2005) gives a damning review of the impact of this management on the invertebrate interest.

This paper contributes to the debate using the results of a survey undertaken for English Nature of two water meadow Sites of Special Scientific Interest (SSSI) lying a few kilometres either side of Salisbury on the River Avon in Wiltshire. The survey was intended to establish what invertebrate interest was present on the sites and whether water meadow management was necessary to maintain it.

Sites and methods

Sites

The water meadows at Lower Woodford (SU1234) extend for 1.5km along the river and are usually one field wide. Water courses are deep permanent drains, shallower drains that dry partially or completely although often remain damp, and gutters which are opened up to flood the meadows. Gutters also vary in the extent to which they dry out completely, so that some retain a wetland flora while the vegetation on others is indistinguishable from that of the meadow. The water meadow system had been created on an originally flat floodplain, so the fields are more-or-less level. The difference in height between highest to lowest points of the drainage system is often considerable (perhaps up to 70 cm), and the spacing of gutters and drains is often as little as 7–10 m, resulting in a pronounced 'ridge-and-furrow' topography in some fields.

Britford SSSI (SU1627) is about 10km downstream of Lower Woodford, and lies along 1km of a canalised branch of the River Avon. The river feeds the higher side of the site which falls away across a single wide field to a stream on the lower edge of the site. The fall from the river to the stream is considerable as the fields are far from level. The main carriers supplying the gutters are permanent 'streams' flowing often in steep-sided gullies up to 1m deep. In most fields, the gutters and drains are dry except when submerged, and nearly all support vegetation that is indistinguishable from the surrounding semi-improved dry meadow. There are occasional low-lying areas where wetland vegetation has developed but even some of these dry completely by the end of summer.

The hydrological regime differs between the sites. At Lower Woodford, submergence is carried out on a rotation of about eight weeks, starting at the upstream end of the site. Fields are flooded for about two weeks, and then the grass allowed to grow before cattle are turned out to graze them. This continues down the site, with the cattle following the submergence, so that during the 18 weeks of the survey, each compartment had been flooded twice. Consequently, the water courses are usually fairly wet or at least damp for most of the time, and only the higher gutters dry out completely. Britford is submerged about four times between January and late summer, each period lasting only a few days (Stearne & Everard, 2005). As a result of the steep gradient of the fields, chalk soil, short submergence time and the deep gullies in which permanent water flowed, the site has very few areas of wetland for most of the summer.

Much information on water-meadow management and conditions, including detailed information on both Britford and Lower Woodford, can be found in Everard (2005) and Cook and Williamson (2007).

Field methods

Invertebrates were sampled during five visits from the beginning of June to mid September 2002. The groups identified included many families of flies and several families of beetles, including Carabidae, some Staphylinidae, Chrysomelidae, Cantharidae and all water beetle families. They were collected each month by pitfall trapping and sweep-netting, and on the last visit in September by pond-netting. Pitfall traps were set at six locations at Lower Woodford and four at Britford, and consisted of a line of four stout polythene tubs 10 cm in diameter placed at five-pace intervals; ethylene glycol was the preservative. Most of the lines of traps were placed close to drains in areas that appeared from the vegetation to be permanently damp. Sweep-net samples were taken from June to August from water courses within 14 fields at Lower Woodford and six fields at Britford, although not all field were sampled on every visit (4–6 at Britford, 7–11 at Lower Woodford). The wettest channels were selected for sampling on each visit. Samples were standardised by collecting for a nominal 15 minutes at each sampling point in June, and 10 minutes in July to September, during which time insects were removed frequently from the net using a pooter. Pond-net samples consisted of netting and sorting the catch on a polythene sheet for 30 minutes at each point, with about five separate net-hauls taken within this period; five samples were taken at Lower Woodford and four at Britford.

Comparison of gutters and drains

To investigate whether there was a difference in the assemblages at gutters and drains, sweep-net samples were collected from 20 drains and 10 gutters at Lower Woodford on 1 and 17 June. These included some channels that were sampled on both dates. The data were analysed by ordination using DECORANA with no

down-weighting for species that were rare in the dataset (Hill, 1979). A brief account of this technique was provided by Drake (2008). Species were allocated to broad assemblage types using the preliminary placements in English Nature's Invertebrate Species-habitat Information System (ISIS) which classifies species in assemblage types in a hierarchical manner (Webb & Lott, 2006). Only the highest level, Broad Assemblage Type, was used here. As the sampling points had not been selected randomly, parametric statistics were inadmissible so values for species-richness for each type of water-course were expressed as medians and the interquartile range, and medians were compared using the Mann-Whitney U test. Percentages were arcsine-transformed before calculating median values. No environmental variables were collected so possible causes for trends in the ordination could not be tested

Rarity measures

Rarity statuses were obtained from the biological recording package Recorder 3.3 and updates using the IUCN system from Joint Nature Conservation Committee reviews (Falk & Crossley, 2005; Foster, in prep.).

Results

Species composition

Lower Woodford supported slightly more species and more wetland specialists than found at Britford, but similar numbers of nationally rare or scarce species. Of the 441 species at Lower Woodford, 261 were wetland species (59% of the total) and 21 were nationally rare or scarce (4.8%), compared to 390 species at Britford, with 231 wetland species (59%) and 19 rare or scarce species (4.9%). Among the 70 most frequently recorded species, the only nationally scarce species were the staphylinid *Paederus fuscipes* Curtis at both sites, the snail-killing fly *Pherbellia nana* (Fabr.) at Lower Woodford and the carabid beetle *Chlaenius nigricornis* (Fabr.) at Britford.

All the nationally rare or scarce species at both sites were wetland specialists (Table 1). About half of those at Lower Woodford were probably widespread here since they were not found just as single individuals, although most were not frequently recorded. As sampling intensity varied across the site and through the year, direct comparisons between different parts of the site cannot be made but the representation of uncommon species was similar at eight points that were sampled on most visits. The representation of uncommon species at Britford was more uneven. Most of them were found as single individuals in one or two places; more were found at two more-or-less permanently wet areas. About a third of these species (11) were found at both sites, and most were among the more frequent rarities.

Carabids beetles were moderately well represented at both sites. They were a mix of wetland and grassland species, including nine or ten species of *Pterostichus* and *Poecilus* but rather fewer *Agonum* and *Bembidion* than expected on a wetland. Nationally scarce species were *Elaphrus uliginosus* Fabr., *Oodes helopioides* (Fabr.) and *Chlaenius nigricornis* (Fabr.) at both sites, and *Pterostichus anthracinus* (Panzer) at Britford. Water beetles were also moderately well represented, although were sampled by pond-netting on only one occasion so were probably under-recorded. The association resembled that found in mesotrophic lowland ponds and ditches, with just a few species, such as *Agabus paludosus* (Fabr.), *Stictotarsus duodecempustulatus* (Fabr.), *Elmis aenea* (Müller) and *Haliplus fluviatilis* Aubé being confined to flowing water. However, the composition was mundane, apart from the occurrence of the rare hydrophilid *Cercyon granarius* Erichson at both sites. The only other scarce water beetle was a single specimen of the lotic *Ochthebius*

Table 1. Nationally rare or scarce species at Britford and Lower Woodford water meadows.

Family	Species	Status		Britford		Lower Woodford	
		JNCC	IUCN	Records	Sites	Records	Sites
COLEOPTERA							
Cantharidae	*Cantharis fusca* L.	Nb		2	2		
	Silis ruficollis (Fabr.)	Nb				2	2
Carabidae	*Chlaenius nigricornis* (Fabr.)	Nb		7	3	17	6
	Elaphrus uliginosus Fabr.	Nb		1	1	1	1
	Oodes helopioides (Fabr.)	Nb		3	3	8	3
	Pterostichus anthracinus (Panzer)	Nb		1	1	9	4
Chrysomelidae	*Plateumaris rustica* Kunze	Nb		1	1	3	3
Hydrophilidae	*Cercyon granarius* Erichson	RDB3	LRnt	2	2	7	1
	Cryptopleurum crenatum (Kugelann)	Nb		1	1		
	Ochthebius bicolon Germar	Nb	LRnsB	1	1		
Staphylinidae	*Paederus fuscipes* Curtis	Nb		14	6	19	7
	Stenus canescens Rosenhauer	Nb		1	1		
DIPTERA							
Anthomyzidae	*Anagnota bicolor* (Meigen)	Nb				2	2
Aulacigastridae	*Stenomicra cogani* Irwin	pRDB3		1	1		
Chloropidae	*Melanochaeta pubescens* (Thalhammar)	Nb		2	2	2	2
	Rhopalopterum femorale (Collin)	Nb				2	2
Dolichopodidae	*Thrypticus nigricauda* Wood	Nb	LRns			1	1
Empididae	*Hilara pseudochorica* Strobl	Nb	LRns	1	1		
Lauxaniidae	*Homoneura mediospinosa* Merz	RDB3				2	2
Limoniidae	*Molophilus propinquus* (Egger)	Nb		4	3	9	7
Sciomyzidae	*Colobaea distincta* (Meigen)	Nb				1	1
	Colobaea punctata (Illiger)	Nb				1	1
	Pherbellia griseola (Fallén)	Nb		1	2	3	3
	Pherbellia nana (Fallén)	Nb		2	2	15	7
	Psacadina verbekei Rozkošný	Nb				2	2
	Pteromicra leucopeza (Meigen)	RDB2		1	1		
Sepsidae	*Themira gracilis* (Zetterstedt)	Nb				1	1
Stratiomyidae	*Oxycera morrisii* Curtis	Nb				2	2
	Stratiomys potamida (Meigen)	Nb		1	1		
Syrphidae	*Neoascia obliqua* Coe	Nb				1	1

bicolon Germar at Britford. Chrysomelid leaf beetles were another well represented family, with 40 species in total, although only *Plateumaris rustica* Kunze was of particular note. Local wetland leaf beetles that were widespread included *Aphthona nonstriata* (Goeze), *Donacia semicuprea* Panzer, *D. simplex* Fabr., *Galerucella sagittariae* (Gyllenhal) and *Prasocuris junci* (Brahm), and infrequent ones being *Aphthona lutescens* (Gyllenhal), *Cassida murraea* L., *Chrysolina menthastri* (Suffrian) and *Hippuriphila modeeri* (L.).

Sciomyzid snail-killing flies, dolichopodids and ephydrid shore flies are good indicators of wetland conditions. Thirty-four species of dolichopodids were found at the two sites, and included some of the most widespread flies recorded in the survey, notably *Argyra vestita* (Wiedemann), *Dolichopus latelimbatus* Macquart, *Syntormon pumilum* (Meigen) and *Teucophorus spinigerellus* (Zetterstedt) at Lower Woodford. However, many were present only in low numbers and none was nationally scarce. Of the 29 species of ephydrids recorded, only *Parydra pusilla* (Meigen) can be considered uncommon. The remainder are widespread in lowland wetlands with well vegetated water margins. Sciomyzids were conspicuously more widespread and frequent at Lower Woodford than at Britford and less common species such as *Tetanocera arrogans* (Meigen), *Pherbellia ventralis* (Fallén) and *P. nana* (Fallén) were among the most frequent of them. Four nationally scarce species were found at Lower Woodford and the rare *Pteromicra leucopeza* (Meigen) at Britford.

Comparison of gutters and drains

Invertebrates in the 30 samples were mainly flies (196 species, 70% of the total) and beetles (74 species, 27%). Samples from gutters separated clearly from those from drains along the first ordination axis (Fig. 1). It was evident that water permanence was the key factor influencing assemblages.

Many more species were found in the drains than in the gutters, and the median numbers of common, local and nationally rare or scarce species were all significantly greater in the drains (Fig. 2a). The proportions of species in these three rarity classes were very similar in both gutters and drains, with a slight but not significantly greater proportion of less common species in the drains (Fig. 2b).

There were more than twice as many wetland species at drains than at gutters whereas there were no significant differences in the median numbers of grassland species (Fig. 3a). Wetland species comprised a significantly larger proportion of the catch at the drains, with a correspondingly significantly lower proportion of grassland species (Fig. 3b).

Nearly all of the most frequently occurring species showed no obvious preference for gutters or drains. These undiscriminating species included mainly common insects and only about half of them have wetland affinities. Few wetland species congregated at the flooded gutters, and the conspicuous species were almost entirely common shore-flies [*Parydra coarctata* (Fallén), *Scatella tenuicosta* Collin] that were also common at the drains. Of more interest were the widespread species found often at drains and not or rarely at gutters. Species showing an apparent preference for drains were defined as those found in at least six samples from drains (about one third of all drain samples) and at least twice as frequently as in gutters (taking into account the disparate effort at gutters and drains). Of the 36 species meeting these criteria, 33 are associated with wetlands (Appendix 1). A quarter of these are local species and one, the cranefly *Molophilus propinquus* (Egger), is nationally scarce. In comparison, only seven widespread species were found at least 1.5 times more often at gutters than drains; none of these was actually scarce at the drains and all are nationally common species (Appendix 1).

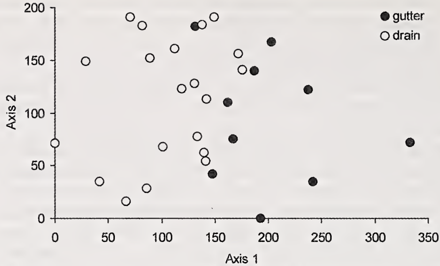

Figure 1. DCA ordination scores of the first two axes differentiated as gutters and drains at Lower Woodford water meadows, Wiltshire.

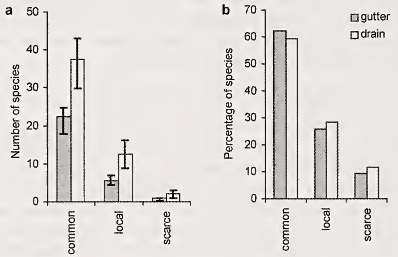

Figure 2. (a) Median number of species (with interquartile range) in three rarity status groups in gutters and drains at Lower Woodford water meadows, Wiltshire. (b) Median percentage of species in each rarity class.

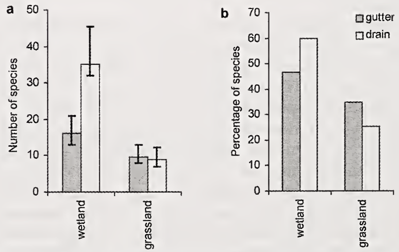

Figure 3. (a) Median number of species (with interquartile range) classified by habitat affinity (wetland or grassland) in gutters and drains at Lower Woodford water meadows, Wiltshire. (b) Median percentage of species in each habitat group.

Discussion

The term water meadow is often used uncritically to refer to wet floodplain grassland with water channels. This is usually a productive habitat for invertebrates, and is the basis of the assumption that 'water meadows' support a rich fauna. The present results show that Lower Woodford and Britford did support many species that included a large proportion of wetland species but that the representation of nationally scarce and rare species was low. The sites therefore provide wetland habitat, which is always useful in the well-drained British countryside, but its quality was probably no more exceptional than that of many undesignated mesotrophic lowland wetlands. The most species-rich patches at both sites were areas that were nearly permanently wet as a result of being more low-lying, such as most drains. Uncommon species were distributed fairly evenly across Lower Woodford, matching the even distribution of permanent water, whereas they were far more patchily distributed at Britford where permanently wet areas were sparsely distributed. Clearly, areas that were wet permanently were more important than those only intermittently wet since the whole of both sites would, at one time or another, be flooded. That the greatest interest lies in the permanently wet drains mirrors similar conclusions for plant communities, which at Britford are species-poor over most of the site but richer next to the drains and river margin (Cummings & Cutting, 2007). However, maintaining permanently wet conditions does not depend upon traditional water-meadow management.

The assemblages of water beetles and flies were typical of those expected from mesotrophic wetlands in southern England. Only the sciomyzid snail-killing flies formed a notably rich assemblage, and they may have benefited from the fluctuating water levels resulting from water-meadow management, at least at Lower Woodford. This may be a direct result of aquatic or wetland molluscs on which their larvae feed, being exposed to ovipositing females as water levels fluctuate with the flooding regime. The tiny water beetle *Cercyon granarius*, found at both sites, was the most unexpected rare species, being particularly sparsely distributed in southern England and not previously known from Wiltshire (Garth Foster, pers. comm.), but there seems no reason to suppose that water meadow management was responsible for its occurrence in the Avon valley.

The comparison of the drains, which mostly remain permanently wet, and the gutters, which dry out for long periods, showed that drains were of considerably greater value to both common and uncommon wetland species, even though the two types of water courses were often separated by only a few metres and both were wet when sampled. One of the basic tenets of managing habitats for invertebrates is that the regime should remain sufficiently stable to allow annual species, which includes most invertebrates, to complete their life-cycle (Kirby, 1992). Water meadow management has a highly unstable hydrological regime that is not matched in temperate Europe by any natural system other than puddles. It generates saturated soil with a thin film of water that should prove attractive to many wetland species but which lasts for only 2–3 weeks before drying out again. The soil moisture content and vegetation therefore do not resemble those of permanent wetlands; for example, most gutters were scarcely differentiated from the surrounding meadow when dry, although the grasses sometimes included those, such as marsh foxtail (*Alopecurus geniculatus*), that favour periods of submersion. The drains, by comparison, would still be present even when the meadows cease being managed traditionally. Among the features that probably made the drains more attractive than the gutters was the constantly saturated soil at their margins and often a well developed fringe of larger marginal plants such as reed sweet-grass (*Glyceria maxima*) and brooklime (*Veronica beccabunga*) which were usually absent from the gutters.

There was no evidence from this survey that water-meadow management actually damaged the invertebrate interest. Two possibly detrimental effects of the unnatural hydrological regime are that the newly wetted areas could attract ovipositing females, whose offspring would not survive once submergence ceased, and the other is the known damage to soil invertebrates caused by exceptional summer flooding (Neckles, Murkin & Cooper, 1990, Wöllecke, Ispas & Bölscher, 1996). Summer flooding of grassland by rivers is particularly damaging compared to normal winter flooding because the higher temperature promotes rapid decomposition of submerged vegetation, leading to anoxic conditions. However, water meadow management is far from this scenario, since the careful control of water supply may saturate the soil but does not kill the plants.

It was concluded that traditional water meadow management was not a key factor in maintaining the invertebrate interest of these two sites, although there was no direct evidence that it was actually damaging. The main reason for the moderate interest of these sites was the saturated conditions of low-lying areas and water margins of permanent ditches. As long as low-lying areas are not drained and ditch maintenance is conducted on medium to long-term cycles, it is likely that there would be no discernible change in the species present, and no loss of any species of note, if water meadow management stopped.

Sheppard (2005) made a number of points in his argument that traditional water meadow management is inimical to invertebrate conservation, although these were based on theoretical premises. Two of his main objections were that the interest of 'water meadows' is usually confined to naturally wet patches of habitat, and that the management system is erratically disruptive. These points are supported by the present results.

Acknowledgements

The survey was arranged and funded by English Nature's Wiltshire Team, and the author thanks Natural England for permission to publish this paper. I thank the landowners for access permission, and Garth Foster for help with my *Cercyon* identifications.

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Appendix 1. Widespread species found more frequently at either drains or gutters in sweepnet samples from 10 gutters and 20 drains in June at Lower Woodford. The number of samples for each species is given for each type of channel.

Species	Order, Family	Gutter	Drain
More frequently at drains than at gutters			
Donacia simplex Fabr.	Coleoptera, Chrysomelidae	0	10
Epitrix pubescens (Koch)	Coleoptera, Chrysomelidae	0	7
Phaedon armoraciae (L.)	Coleoptera, Chrysomelidae	1	13
Stenus cicindeloides (Schaller)	Coleoptera, Staphylinidae	2	9
Stenus nitidiusculus Stephens	Coleoptera, Staphylinidae	0	7
Anthomyza collini Andersson	Diptera, Anthomyzidae	0	7
Anthomyza gracilis Fallén	Diptera, Anthomyzidae	1	8
Calamoncosis glyceriae Nartchuk	Diptera, Chloropidae	1	16
Diplotoxa messoria (Fallén)	Diptera, Chloropidae	1	10
Elachiptera cornuta (Fallén)	Diptera, Chloropidae	1	10
Argyra diaphana (Fabr.)	Diptera, Dolichopodidae	0	11
Argyra vestita (Wiedemann)	Diptera, Dolichopodidae	0	7
Campsicnemus curvipes (Fallén)	Diptera, Dolichopodidae	3	13
Dolichopus plumipes (Scopoli)	Diptera, Dolichopodidae	1	8
Rhaphium caliginosum Meigen	Diptera, Dolichopodidae	0	6
Teuchophorus spinigerellus (Zetterstedt)	Diptera, Dolichopodidae	0	7
Hyadina guttata (Fallén)	Diptera, Ephydridae	0	6
Notiphila cinerea (Fallén)	Diptera, Ephydridae	3	13
Notiphila maculata Stenhammar	Diptera, Ephydridae	0	8
Parydra fossarum (Haliday)	Diptera, Ephydridae	1	8
Cleigastra apicalis (Zetterstedt)	Diptera, Scathophagidae	0	12
Erioptera fuscipennis Meigen	Diptera, Limoniidae	1	14
Phylidorea ferruginea (Meigen)	Diptera, Limoniidae	1	14
Molophilus obscurus (Meigen)	Diptera, Limoniidae	1	8
Molophilus propinquus (Egger)	Diptera, Limoniidae	0	7
Cordilura albipes Fallén	Diptera, Scathophagidae	2	9
Scathophaga stercoraria (L.)	Diptera, Scathophagidae	1	6
Pherbina coryleti (Scopoli)	Diptera, Sciomyzidae	2	17
Tetanocera arrogans (Meigen)	Diptera, Sciomyzidae	1	16
Tetanocera ferruginea Fallén	Diptera, Sciomyzidae	0	6
Tetanocera silvatica Meigen	Diptera, Sciomyzidae	2	10
Sepsis punctum (Fabr.)	Diptera, Sepsidae	1	8
Neoascia tenur (Harris)	Diptera, Syrphidae	1	12
Platycheirus granditarsus (Forster)	Diptera, Syrphidae	0	6
Tipula lateralis Meigen	Diptera, Tipulidae	1	10
Tetrix subulata (L.)	Orthoptera, Tetrigidae	1	7

(continued)

Appendix 1. (Continued)

Species	Order, Family	Gutter	Drain
More frequently at gutters than at drains			
Sepsis orthocnemis Frey	Diptera, Sepsidae	5	7
Limnia unguicornis (Scopoli)	Diptera, Sciomyzidae	7	9
Pherbellia cinerella (Fallén)	Diptera, Sciomyzidae	6	6
Dicranomyia modesta (Meigen)	Diptera. Limoniidae	5	3
Hydrellia obscura (Meigen)	Diptera, Ephydridae	4	5
Scatella tenuicosta Collin	Diptera, Ephydridae	6	6
Chaetocnema concinna (Marsham)	Coleoptera, Chrysomelidae	7	7

SHORT COMMUNICATION

Recent records of *Platyrhinus resinosus* (Anthribidae) in Surrey. – On 3.v.2008 a single specimen of *Platyrhinus resinosus* (Scopoli) was found on a dead wood pile in the first author's garden at Ash (SU904506) in Surrey (VC17): the wood was covered with jews-ear fungus *Auricularia auricula-judae*. It should be noted that the dead wood in the garden was 'liberated' from a fire-wood pile at a Wildlife Trust depot! Subsequent investigation suggests that the wood originated from Newlands Corner, near Guildford (TQ0449) where it was felled for health and safety reasons. However, ash supporting the cramp-ball fungus *Daldinia concentrica* is a component of the wooded area adjacent to the garden. Several individuals of another anthribid *Platystomos albinus* (L.) were also present on the same log.

On the 6.v.2008 the second author also found a single adult *P. resinosus* inside a large cramp-ball *Daldinia* spp. on a large fallen beech, an unusual host for this fungus (Brian Spooner pers. comm.), close to the Thames in the wooded edge of the Old Deer Park, Kew (TQ168755).

Morris (1990) regards *P. resinosus* as the commonest member of the Anthribidae in Britain. However, these records appear to be only the second and third for VC17 since the late I.S. Menzies recorded it at Ashtead in 1987 (Denton, 2005). It remains to be seen whether two records so close together after 21 years, are the vanguard of a boom, or mere coincidence. – Scotty Dodd, 1 Pine Cottages, Harpers Road, Ash, Surrey, GU12 6BZ & Jonty Denton, Old Hall Place, Hussell Lane, Medstead, Hampshire, GU34.

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THE RED WOOD ANT *FORMICA RUFA* (HYMENOPTERA: FORMICIDAE) AT GAIT BARROWS NATIONAL NATURE RESERVE, LANCASHIRE, ENGLAND, 1986–2006: LONGEVITY AND MULTIPLICATION OF NESTS AND THE EFFECTS OF MANAGEMENT

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Abstract

A population of about 100 nests of the red wood ant *Formica rufa* L. at Gait Barrows National Nature Reserve, Lancashire was mapped in 1986, 1991 and 1996. Over 2002–2006 a new map was completed showing all nests that had been recorded in the Reserve since 1986, and indicating those that were still active and those that were defunct. The population is confined to an arc in the north east of the reserve and this has not changed in 20 years, nor has the population size. Forty (48%) of the nests recorded in 1986 were still alive in 2006, and therefore were at least 20 years old. The mean annual turnover of nests was 5.5 %. Management of the reserve had no discernible effect on population size. During the study, observations were made on the circumstances under which multiplication of nests takes place and the effect this has in limiting the ants' ability to spread within sites or colonise new ones (and hence on their conservation). Observations were also made on the effects of vegetation on the establishment and survival of nests and on the natural threats to nests and the ants' ability to respond to them.

Introduction

Gait Barrows National Nature Reserve (SD483775) is situated in the Arnside-Silverdale Area of Outstanding Natural Beauty (AONB). The part known as Gait Barrows, which was declared in 1975, consists of wooded limestone pavement that has been severely disrupted by limestone removal before its acquisition by the Nature Conservancy Council (NCC), with an open central area which is relatively undamaged. Later the Reserve was extended to include Hawes Water, one of Britain's few marl lakes, and the adjacent Hawes Water Moss, formerly reclaimed for agriculture but now reverted to reed bed. The woodlands consist of the typical mixture of ash, oak *Quercus* spp. and birch *Betula* spp. that is found on limestone sites, with groves of yew and a few very fine large clones of small-leaved lime, probably the oldest trees on the site.

Gait Barrows supports a large population of the wood ant *Formica rufa* L., one of about eight populations in the AONB, these being the northernmost populations in Britain (Robinson, 2001). Robinson (2001) concluded that that the defunct colonies in the Lake District had originally been introduced into pheasantries outside their natural range. In 2001 there were still a few nests alive near Grange-over-Sands, however these have since expired (N.A.R. pers. obs.), so there are now no *F. rufa* nests known to be inhabited on the north side of Morecambe Bay. There is public access to Gait Barrows by two marked trails and to Hawes Water by a track for the disabled. In 1975 the first author was an Assistant Regional Officer of the NCC

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involved in the acquisition of the Reserve, so has been familiar with the site for over 30 years.

Mapping the wood ant population

Over the period 1981 to 1986, A. C. Aldridge, the then Warden of the National Nature Reserve recorded the location of 90 wood ant nests on a large scale map which he had prepared from aerial photographs. These were cumulative records, not a specific survey, but they showed that the ants, though numerous, had a restricted distribution in the Reserve. His first map of 1981 (Fig. 1) shows clearly how the nests are confined to an arc round the north east part of the site.

In 1991, at the instigation of Professor J. B. Whittaker of the University of Lancaster, who had been responsible for various studies of wood ants in the area by students over many years, Aldridge carried out a systematic survey in which he mapped the location of 102 numbered nests. The survey was repeated in 1996 on the same lines by two students from Edge Hill University College, Ormskirk, Lancs. (Farinacci & Smith, 1996).

Management of the site

There are three episodes or phases of management which have affected the site within the knowledge of current researchers:

(i) The removal by the previous owners of limestone pavement for sale as water-worn stone. Fortunately the massive central pavements which were of highest botanical interest were largely undamaged. Elsewhere, large areas were stripped of the surface stratum down to level carpark-like surfaces. Others were left with clints at chaotic angles. Yew trees were exploited for their lower trunks (for veneer), leaving stumps and their tops. By the time the site was purchased by the NCC and declared a National Nature Reserve in 1975 this had disrupted the entire area occupied by the wood ants, and, in fact, most of the woodland.
(ii) Following acquisition, it was found that the Reserve was an important site for two nationally rare butterflies: the High Brown Fritillary *Argynnis adippe* Verity and the Duke of Burgundy *Hamaeris lucina* (L), and much of the management by NCC/EN/NE has been aimed at improving habitat for butterflies. Initially this concentrated on widening rides. Meanwhile, vegetation, especially birch, began colonising the areas of damaged limestone pavement.
(iii) Since 1991, a programme of coppicing by more extensive fellings (coups) has been under way. This has revealed some nests not previously known, and has drastically altered the circumstances of many others. Invading birch has been removed from some of the open areas.

Aims of the study

Accurate mapping of a wood ant population of this size over a long time is a rare (if not unique) phenomenon, which provided the opportunity to study it over a 20 year period. The aims of the study were:

(i) To repeat the mapping of nests last carried out in 1996
(ii) To investigate the rate of turnover, i.e. extinction/creation of nests
(iii) To investigate the effects of coppicing and other management upon nests

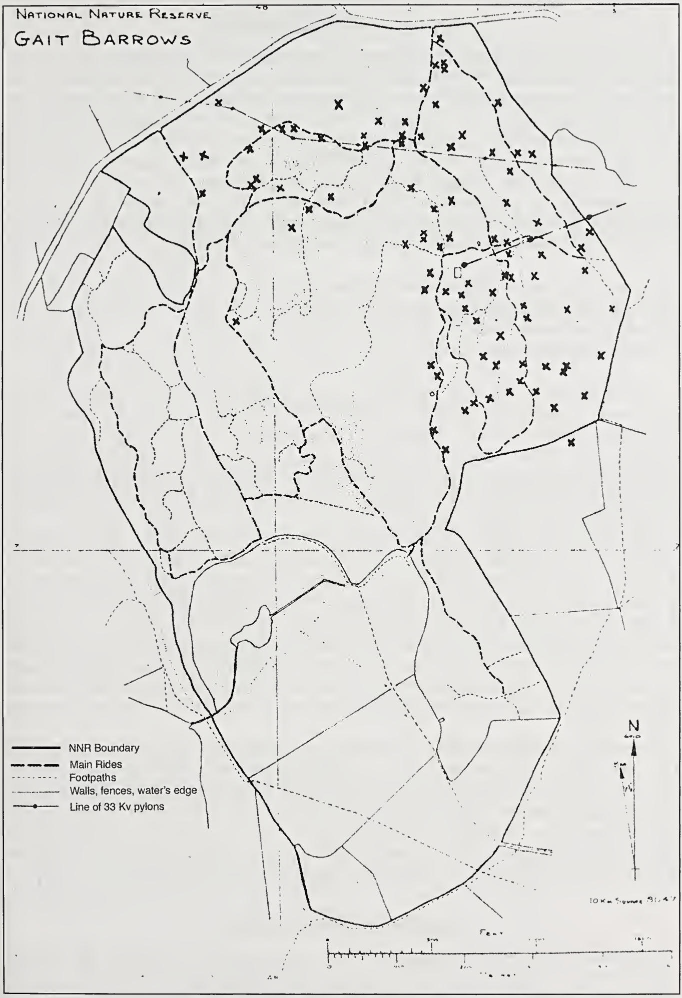

Fig. 1. Distribution of the nests (denoted ×) of the wood ant *Formica rufa* at Gait Barrows NNR, 1981. (See Aldridge, 1986.)

Methods

Mapping the wood ant population

In his report, Aldridge (1991) discusses the properties of the locations of the nests, their size and association with tree species, and turnover in the population. In addition to the maps, all the information recorded about the nests was presented in a table: Details of the Nests. Farinacci & Smith (1996) similarly mapped all the nests they could find, adding a number that were new or had not been recorded before. They also provided a table of nest details. Farinacci and Smith's map was used as the basis for this resurvey which was carried out in stages over the period 2002–2006. Final observations were made in April 2007, but as this was concerned with nests which must have been in existence in 2006, the study can be considered to cover the 5 year period 2002–2006. This involved locating and identifying:

(i) nests found by Aldridge in 1981–1986
(ii) additional nests found by Aldridge in 1991
(iii) additional nests found by Farinacci and Smith in 1996
(iv) nests formed (or found) since 1996

To keep track of this large number of nests, numbers painted in white on slates were used temporarily during the survey. For the long-term, National Grid References (NGR) to an accuracy of 10 m were recorded, using a hand-held Garmin Etrex GPS receiver. This level of accuracy was found to be adequate for identifying individual nests as they are rarely as close together as this. Hence, NGRs are available for all those nests found between 1986 and 2006, whose locations could still be detected in 2006.

Nests which were still recognisable but contained no sign of live ants or worker activity were recorded as 'defunct'. Active nests had workers visible on the surface or inside the top layers. The vegetation immediately around the nest and the diameter of the nest to the nearest 0.5 m were recorded. 'Nests of the year' can be recognised by the absence of a soil base. In the autumn the workers excavate chambers in the soil beneath, in which the colony passes the winter. The excavated material forms a soil base to the mound. As this process is repeated every year, the soil base gradually spreads (up to a maximum diameter of about 3 m on this NNR) and gives an indication of the age of the nest, but the diameter of the thatch mound on top rarely exceeds 1 m.

Information about the size and condition of nests from the Tables of Details of 1991 and 1996 was transferred to a new Register of Nests which accompanies the report to Natural England (Robinson, 2006). This charts the progress of nests before and during the current survey, and records all the nests which have been found on the Reserve to date. Aldridge's numbering ran from 1 to 102, Farinacci and Smith's from 103 to 147, and this study continues from 150 to 200. (The numbers for nests that have become defunct are redundant; they have not been re-used.)

Longevity and turnover of nests

The records for 1986 (Aldridge, 1991) were examined to establish the earliest records of nests within this 20 year study. From examining the maps and table, 83 nests were identifiable as having been active in 1986. These included two nests that were first recorded in 1991 but which, on account of their size, must have been present in 1986. It also included four 1986 nests which had moved their mound a

short distance (the entire colony, not an offshoot.) Therefore 83 nests were used as the baseline for observations on longevity.

The 1991 survey, which found 102 active nests, was the first to aim to cover all the nests on the Reserve, and this was used as the starting point for observations on the turnover of nests. The 104 nests marked on Farinacci and Smith's map are used for the 1996 turnover figure, and final data on 99 active nests were collected in this study (see Table 1).

Results

Surveying the wood ant population

The numbers of active and defunct nests of *F. rufa* observed at Gait Barrows NNR during the period 1986–2006 are shown in Table 1. The map produced by the 2002–2006 survey (Fig. 2) shows:

(i) all the nests which were found between 1986 and 2006
(ii) the surveys in which nests were recorded and whether they were active or defunct by 2006
(iii) that the nests were confined to a crescent-shaped area in the north east of the site, and that this has not changed over 20 years

Longevity and turnover of nests

(a) Longevity of nests

Of the 83 nests active in 1986, 40 (48%) were still active in or near their original mounds in 2006 (Table 2). This indicates an age of at least 20 years, as it was not known how old they were when they were first found. Forty-three were found to be defunct (Table 3). The numbers of active and defunct nests of *F. rufa* found at Gait Barrows NNR during the period 1986–2006 are shown in Table 1.

Table 1. Turnover of nests between surveys

1986	
Number of active nests located 1981 to 1986	90 (N.A.R. 83)
Number of these nests still active in 1991	60
Number of these nests defunct in 1991	30
1991	
Number of active nests recorded in 1991	102
Number of active nests first recorded in 1991	42
Number of defunct nests recorded in 1991	38
Number of defunct nests first recorded in 1991	8
1996	
Number of active nests recorded in 1996	112 (only 104 on map)
Number of active nests first recorded in 1996	33
Number of defunct nests recorded in 1996	25
Number of defunct nests first recorded in 1996	2
2006	
Number of active nests recorded in 2006	99
Number of active nests first recorded 2002–2006	44
Number of 1996 nests defunct by 2006	61
Number of defunct nests first recorded in 2002–2006	9

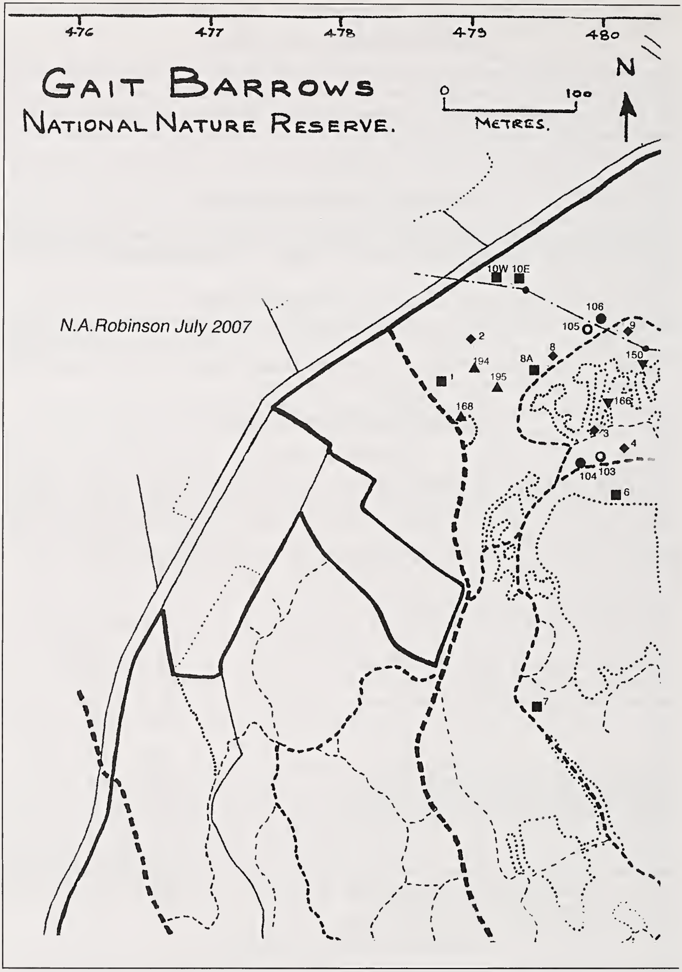

Fig. 2. Distribution of nests of the wood ant *F. rufa*, Gait Barrows NNR, 1986–2006. Nests active in 2006: ■ Recorded 1991; ● Recorded 1996; ▲ Recorded 2002–2006; Nests defunct by 2006: ◆ Recorded 1991; ○ Recorded 1996; ▼ Recorded 2002–2006. See figure 1 for key to lines.

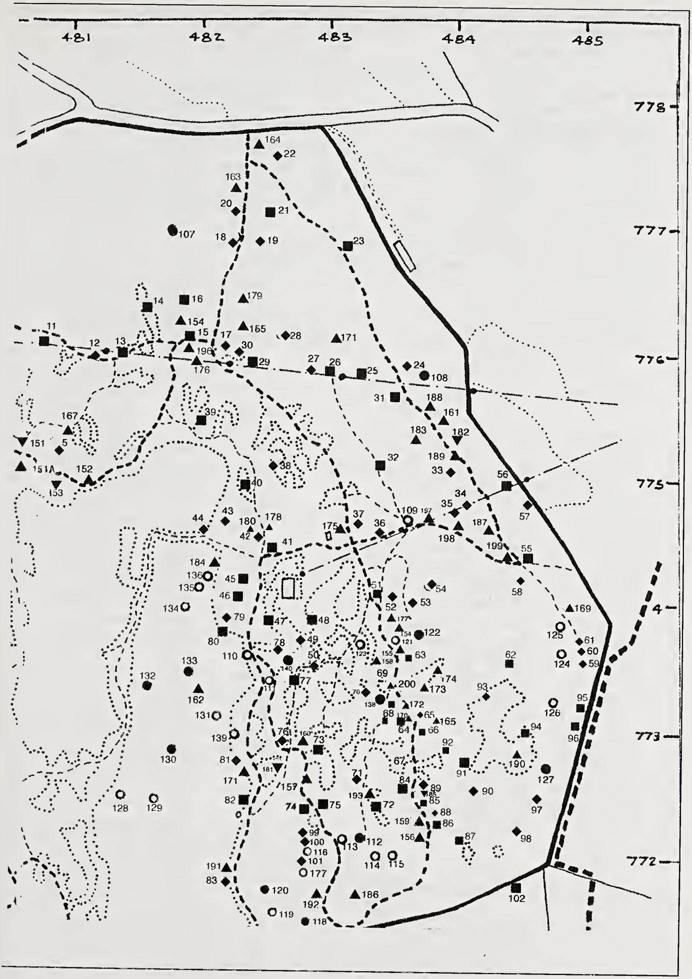

Fig. 2. *(continued)*

Table 2. Conditions in 2006 of *F. rufa* nests mapped in 1986 and still active.

No.	OS Grid Ref	Cover	Management
Active in original mound			
1	SD47877758	Hazel regrowth	Coppiced 1984
7	SD47947734	Uncoppiced hazel	Coppiced 1983/4
10	SD47937766	Bracken, hazel regrowth 2 nests	Powerline coppiced 1978/9, 1988/9
11	SD48067761	Bracken	Powerline coppiced 1978/9, 1988/9
13	SD48137760	Bracken, sheltered by yew	Powerline coppiced 1978/9, 1988/9
16	SD48187764	Exposed, except rim	Coppiced 1982/3
21	SD48257771	Bracken, sheltered by yew	None
23	SD48397764	Edge of woodland ride	None
25	SD48337757	Bramble and hazel	Powerline coppiced 1978/9, 1988/9
26	SD48297757	Bracken	Powerline coppiced 1978/9, 1988/9
31	SD48257754	Under oaks	Exposed by recent coppicing
32	SD48327751	Edge of woodland under hazel regrowth	Coppiced 1982/3,1988/9
40	SD48227740	Under a yew	Pre 1975 damage, none since
45	SD48227740	Under juniper on pavement	Pre 1975, birch regeneration cut 1982–5
47	SD48247739	On rubble and stump, no cover	Pre 1975 damage, none since
48	SD48287738	On rubble, no cover	Pre 1975 damage, none since
51	SD48337739	On rubble, edge of trees	Pre 1975 damage, none since
55	SD48457745	Under bramble	Sycamore removed 1982/3
62	SD48447735	Gap in woodland	None
63	SD48377371	Bracken	Coppiced and bracken cut 1984/5/6
68	SD48327729	Bracken, hazel	Coppiced 1984
72	SD48337723	In grass under old larch	Pre 1975 damage, none since
73	SD48307726	Under hazel regrowth	Hazel recently removed
74	SD48287719	On rubble, no cover	Pre 1975 damage, none since
75	SD48297720	Under hazel regrowth	Pre 1975 damage, none since
77	SD48277731	Hazel, bramble	Pre 1975 damage, none since
80	SD48207736	Under edge of juniper, hazel	None
81	SD48237725	Hazel on edge of pavement	None, nest weak
82	SD48217722	Hazel on edge of pavement	None, nest weak
86	SD48377718	Bracken	Coppiced 1991 and later
87	SD48377719	Bracken	Coppiced 1991and later
91	SD48417725	Hazel	Pre 1975 damage, none since
92	SD48387726	Hazel	Pre 1975 damage, none since
95	SD48507732	Edge of woodland	None
96	SD48507730	Edge of woodland	None
102	SD48427716	Under woodland	None, but former Lancaster University study site
Active, but mound moved from 1986 location			
8	SD47947757	Hazel regrowth	Pre 1975 damage, none since
39	SD48197755	Bramble, cut back by N.A.R.	Pre 1975 damage, coppiced 1997–2006
41	SD48257743	Bramble, hazel	Pre 1975, has moved twice
84	SD48377720	Bracken, more or less open	Pre 1975 damage, none since

Table 3. Conditions in 2006 of *F. rufa* nests recorded in 1986 but now defunct

No.	OS Grid Ref	Last alive	Cover	Management
2	SD77907761	1998	None	Pre 1975, none since
3	SD78007753	1996	None	Pre 1975, none since
4	SD78007752	1997	Dense bramble	Pre 1975, coppiced 1976
5	SD78067755	1997	Dense bramble	Pre 1975, coppiced 1976
9	SD78007761	1996	General vegetation	Powerline coppiced '78/9, '88/9
14	SD78137768	2004	General vegetation	Pre 1975, none since
15	SD78187765	1996	Hazel regrowth	Side of track, coppiced 1983
17	No remains	1996	?	Coppiced 1983
18	SD78217765	2004	General vegetation	Pre 1975, none since
19	SD78337764	1996	Hazel and hawthorn	Pre 1975, none since
22	SD78257774	2004	Bramble, bracken, hazel	Exposed by recent coppicing
24	No remains	1996	?	?
28	SD78277766	2004	Hazel and bracken	Powerline coppiced '78/9, '88/9
34	SD78417747	2004	Hazel regrowth	Coppiced 1983/4 and later
36	No remains	1996	?	Powerline coppiced 1983/4
37	No remains	1996	?	None?
38	No remains	1996	?	?
42	No remains	1996	?	?
43	No remains	1996	?	?
44	No remains	1996	?	?
49	SD78297737	2003	Hazel regrowth	Pre 1975, none since
50	No remains	1996	?	Pre 1975, none since
52	No remains	1991	Hazel	Pre 1975, none since
53	No remains	1996	Dense woodland	None
54	No remains	1996	Dense woodland	None
57	No remains	1991	General vegetation	Powerline coppiced 1983/4
58	SD77457742	2003	Under holly	None
59	Uncertain	1991	Probably under hazel regeneration	?
67	No remains	1991	?	?
70	No remains	1996	?	Pre 1975
71	No remains	1996		Pre 1975
76	SD78257727	2003	Bramble	Pre 1975
78	SD78257734	2004	Hazel, bramble	Pre 1975
79	No remains	1991	?	?
83	SD78217714	1996	Hazel	None
85	No remains	1991	?	Coppiced 1991 and later
88	No remains	1991	?	Coppiced 1991 and later
89	No remains	1991	?	Coppiced 1991 and later
90	No remains	1996	Woodland?	?
93	SD78427732	1991	Ash, yew	None
97	No remains	1991	Dense yew woodland	None
98	No remains	1991	Dense yew woodland	None
99	No remains	1996	Hazel regeneration ?	?

(b) Rate of turnover (i.e. creation/extinction) of nests

Aldridge (1991) gave an analysis of the number of new nests which had been formed, and those which had become extinct, between his surveys. Farinacci and Smith (1996) extended this analysis to their survey, and it has been completed to date in Table 1. These records indicate that:

(i) over the 20 year period since 1986 the overall population has remained remarkably stable at around 100 nests (mean = 98.5, standard deviation 5.92),
(ii) this is supported by the information that, over the period 1991–2006, 115 new nests were formed and 124 went defunct (Fig. 3).

The 102 nests present in 1991 produced 33 new nests by 1996 = 32% or 6.4% per annum. The 104 nests present in 1996 produced 44 new nests by 2006 = 42% or 4.2% per annum. Thus the new nests produced annually between 1991 and 2006 were 4–7% (mean 5.5 %) of the previous population.

Of the 102 nests present in 1991, 25 were defunct by 1996 = 25% or 5% per annum. Of the 104 nests present in 1996 , 61 were defunct by 2006 = 59% or 5.9% per annum. Thus the proportion of nests failing defunct annually between 1991 and 2006 was 5–6% (mean 5.5%).

Therefore the annual turnover of nests in the population was about 5.5 %.

This indicates an average life-span for nests of *F. rufa* of 20 years. The reasons why nests may live for longer or less than this are considered in the discussion.

The effects of management

To try to assess the effects of management on the 1986 nests, those nests which were still active in their original mounds or nearby are listed in Table 2, with details of their present cover and the management that the immediate vicinity received. The same information for defunct nests is presented in Table 3. However there are conspicuous gaps in this information where no trace of the original mound can be found and little or nothing can be deduced about what happened to it.

Nests for which sufficient information was available have been grouped into three management categories: pre 1975 only, NNR post 1975 and 'none' (Table 4). There is remarkably little difference in survival of nests under these three management regimes. Application of the chi-squared test confirms that there is no statistical evidence of any effect of management on nest survival ($\chi^2 = 2.84$, $P = 0.24$).

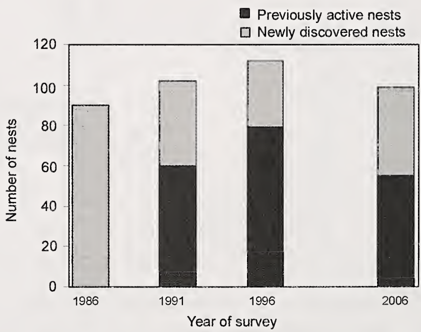

Fig. 3. Total number of *F. rufa* nests recorded in each survey, and proportion of these which were previously established versus newly discovered. Note that only the surveys from 1991 onwards aimed to locate all nests.

Table 4. Management affecting active and defunct nests of *F. rufa*

Management	Active	Defunct
Pre 1975 only	11	12
NNR post 1975	18	23
None	8	8

Discussion

Mapping the wood ant population

The population of *F. rufa* has remained confined to the same area of the reserve during the 20 year survey period. The density of nests in 1996 was 4.3 per hectare (estimated from Farinacci & Smith, 1996) and remains similar now. This is fairly low compared with other recorded populations: Skinner (1980) recorded nine *F. rufa* nests from 6256 m^2 ($= 14.3$ per hectare) in the same geographic area. Welch (1978) recorded even higher densities (up to 27 per hectare) in a coppiced woodland in Kent. It would not be surprising if densities were lower where the ant is at the northern limit of its British range, however, because there is no standard method for defining the area occupied, estimates of nest density tend to be idiosyncratic.

Longevity and turnover of nests

The results indicate that the wood ant population has remained at a fairly constant level over the last 20 years, with nests being created and going extinct at very similar rates. This confirms that the Gait Barrows population is in what has been described as a dynamic state (Robinson, 2001), i.e. one in which old nests are becoming defunct and new nests are being formed, as opposed to the static condition seen on some sites where old nests persist for a long time but production of new nests has ceased. A ten year study of part of a *F. rufa* population in Kent (Welch, 1978) found an initial increase and then a strong decline in nest numbers following coppicing, however, this was a very small-scale study. The results of the current study indicate that at a larger scale, a *F. rufa* population can maintain its size during coppicing.

Nest multiplication

In approaching this subject, it is necessary to consider why the nests are where they are in the first place, and how they increase in numbers. As is clear from Figs 1–2, they are not dispersed about the site, but are confined to a distinct area and show no inclination to spread. This is characteristic of the *F.rufa* populations in the Arnside-Silverdale AONB. Not only are they localised in the area, they are often distinctly localised within the sites themselves. They also show no ability to colonise available habitat adjacent or nearby. There are populations on eight sites in the AONB (Robinson, 2001) – taking the nests on Coldwell Parrock, which were not found until 2001, to be an extension of the Gait Barrows population.

Wood ants depend on the presence of trees where they mainly forage and therefore are only found on sites with a long history of continuous woodland cover. (That is, unless they have been introduced. Moving nests into pheasantries was a widespread practice in Victorian times – see Robinson, 2001). Many of the large woodlands in the AONB have internal walls which indicates that they were formerly in agricultural use. A hardy local breed of sheep, the Warton Crag or Silverdale was kept on these rough grazings (Satchell, 1984). With the decline in the 19th century of the Kendal woollen industry, many of these areas reverted to secondary woodland or were planted.

Little is known about the early management of the Gait Barrows woodland. It is known that part of the NNR was incorporated in a mediaeval deer park, and its name suggests use by goats (Norse geit, a she-goat), which are the only animals that could have found sustenance on the pavement (apart from pigs – part of the pavement was a pig farm in the 1950s). There is no sign that the woodland was ever productive enough to have been managed as coppice with standards or for charcoal (c.f. Roudsea Wood NNR). The presence in the otherwise typical mixed limestone woodland of a few old larch, beech and hornbeam suggests that someone was taking an interest in the woodland in the 19th or early 20th century and was planting what were then fashionable trees. Like many of the woods in the AONB, it was cut for firewood during or after the Second World War (the late Arthur Green, pers. comm.). This did not include the mature trees, but accounts for the multiple stem condition of much of the ash and oak. It is reasonable to suppose that the localised wood ant population represents an area which survived with continuous tree cover through phases of earlier use. The fact that *F. rufa* does not expand into the surrounding suitable habitat is apparently a consequence of limitations on its reproductive capacity, which is considered next.

Social insects with such a high degree of social organisation as ants are, in effect, super-organisms, so the reproductive unit is the colony not the individual (Hölldobler & Wilson, 1990). The main method of reproduction in *F. rufa* is by colony budding, in which mated queens return to the home nest and then move to a new site with some workers (Welch, 1978; Skinner & Allen, 1996). Nests started in this way are small piles of thatch about 20 cm in diameter. Nuptial flights of winged queens and males take place in May and early June. The queens are so large and heavy that they cannot fly far in still air, so mating often takes place on or near the nest, into which the queens return after mating. A second method has been described (Donisthorpe, 1915) in which a queen enters a nest of *F. fusca* L., giving rise to a mixed colony that eventually becomes all *F. rufa*. All the indications are that, in the North of England at least, this is an extremely rare event and that budding is the norm. However, it must remain the only option open to queens which fly or are blown away from their population. Such an event, took place in June 2006 when winged queens were found and photographed on the trig point on Farleton Knott (Andrew Walter, photos). As wood ants are not known on the Farleton Knott – Hutton Roof Crags limestone massif (though the habitat is suitable), they are most likely to have been carried by the wind from exposed nests on Arnside Knott 10 km away. It is not known whether any have started nests with *F. fusca*.

The establishment of new nests by budding is a process which is fraught with hazards. From observations, the first of these is the necessity to disperse beyond the territory of the parental nest. *Formica rufa* nests and their territories are individual domains which are guarded aggressively by workers (Skinner, 1980), especially in the spring when new nests are being established and there is potential for competition. In early summer, workers from some of the new nests can be seen on trails being carried back by workers from the parental nest. Workers being carried in this way adopt a submissive rolled-up 'pupal' pose and are held by the back of the thorax. Not only are workers (and presumably the queen) retrieved in this way, but the nest material is also carried back, so, instead of growing, the nest shrinks and by the autumn has disappeared. This phenomenon has been seen at Gait Barrows, and in more detail on the nearby site of Coldwell Parrock where there are about 17 nests. In 2003 a colony had attempted to form a new nest around the base of a dead birch about 3 m from a very large old nest in a bramble thicket, but the retrieval process was under way. The last that was seen of it was a small knot of workers sheltering the queen, whose nest

had been removed from over their heads. The next year, however, an offshoot nest appeared in exactly the same position. By this time the parental nest was moribund, the wide soil base having become waterlogged, and the new nest survived. The birch has fallen, but the new nest has grown steadily ever since. Very rarely nests of apparently equal dominance can be found within a few metres of each other, but this seems to be an exceptional situation. It also appears that on rare occasions an entire colony will evacuate a nest and move to a new site not far away. Four nests to which this applies are listed in Table 2.

For nests which have been started outside the area under control of the parental nest, the next determining factor for survival is the location. From observations it seems to be very much a matter of chance as to where the migrating group of ants comes to a standstill and tries to start collecting material for a nest. Unlike hive bee swarms, which send out scouts and choose the most promising situation for their nest (Beekman, Fathke & Seeley, 2005), wood ants show no ability to find favourable locations. Offshoot groups can be seen trying to start nests in what to human eyes are manifestly unsuitable places, when ideal situations can be seen a few metres away. There appear to be three features necessary for successful development:

(i) elevation on a rock or stump, which provides drainage and warmth
(ii) good insolation
(iii) shelter from rain, e.g. by being under the edges of overhanging branches

Nests on level ground in the open, or among grass, never make any progress. Nests on stumps and rocks which have good insolation, but no shelter, often survive for several years but do not grow into large mounds. Nests which have all three: rock or stump base, insolation and shelter, can develop into fully active mounds in two years. Therefore reproduction of the colonies is, as for individual organisms, a lottery in which the population is maintained by those which survive.

The effects of management

During the pre-1975 quarrying of the limestone, most of the wood ant nests must have been demolished, but wood ants have remarkable ability to reconstruct their mounds. This disruption may well have had a stimulating effect on the population by opening up the woodland and causing the ants to adopt new sites. Many of the nests from this period are established on piles of rubble or bleached yew stumps. They seem to have tended to settle along the edges of trackways, open areas and wayleave corridors, which provided the requisite features described above.

In considering the impact of subsequent coppicing upon nests, one needs to look at the immediate effects as well as the long-term changes that follow in the coppice cycle. The consequences of large coups are graphically described by Welch (1978): 'It must be borne in mind that traditional methods of coppice management resulted in the piecemeal cutting of small areas at different times of the year. This resulted in a mosaic of vegetation at different stages. Today's mechanised coppicing takes place swiftly, over larger areas, and, almost without exception, during the winter months. Ants emerging in the spring are thus faced with a "devastated" area which initially may not be able to support enough other invertebrates to provide them with prey.' To this may be added that, as coppice tends to be of closed canopy woodland, colonies which were previously sheltered can suddenly find themselves completely exposed to the elements. However, there is no evidence of any instance on this NNR where the actual felling has caused the demise of a nest.

The changes that follow are far more significant, and present both benefits and detriments. Although *F. rufa* nests can persist under closed canopy in the south of England (C.A. Collingwood, pers. comm.), the north west populations are near the northern limit of their range and need some input of sunlight to enable them to maintain the requisite nest temperature (Robinson, 2001). In the absence of management, shading can lead to populations becoming static and ultimately expiring. Coppicing admits sunlight to nests and creates sunlit niches where new nests can develop, but it also promotes the growth of herbaceous and woody vegetation which can soon be shading nests. In a follow-up investigation to Welch's studies at Blean Woods NNR (Adams, 1993), it was found that, after coppicing, the number of *F. rufa* nests in a compartment decreased as the coppice regrew.

The rapidity with which the vegetation regrows varies greatly according to the depth of soil. Where there is no developed soil, as on stripped pavement, it is slow. But there are evidently patches of deeper soil where regrowth is extremely rapid, and soon nests disappear among: false brome, bracken, nettle, brambles and regrowth of hazel and sycamore. To enlarge upon these factors.

(i) In a wet season, false brome can grow about 1 m tall, often forming a 'tonsure' around an exposed nest, but does not appear to endanger nests.

(ii) The previous year's dead fronds of bracken provide a heat-absorbing surround to nests in the spring and early summer, which is the critical period for the ants to replenish their populations (C. A. Collingwood in Robinson, 2001). By the time that the new bracken grows up and begins to shade the nests, the ants have established trails up the nearest oaks. Satchell and Collingwood (1955) considered the spread of bracken to be one of the factors responsible for the decline of *F. rufa* in the Lake District. This may have been the case in the more extreme conditions there, particularly as many of the colonies had been introduced outside their natural range, but 10 (24%) of the 20 year-old nests at Gait Barrows were under bracken (Table 2), which suggests that bracken by itself is not a threat to nests on the NNR. Nettles also sometimes grow around wood ant nests, but similarly do not seem to inhibit them.

(iii) Bramble appears to present a more serious threat. It forms a dense covering which excludes sunlight but admits rain, leading to waterlogging of the nests. Also, being persistent, it is doing this during the critical spring period. Several cases were observed during the study where long-established and vigorous nests finally expired under bramble, though not before each had spawned several new nests.

(iv) Coppice regrowth is of course the intended train of events in management. Where there are deeper soils this can be so rapid that any newly forming nests can be quickly suppressed. Where it is slower, nests are often formed on coppice stumps, which provide elevation, but cases can be seen where subsequent regrowth has eventually shaded and suppressed the nest.

The conclusion that the NNR management of coppicing has not been shown to have benefitted the population is perhaps surprising, since absence of management appears to be the principal factor leading to the decline of populations from the dynamic to the static condition on other sites (Robinson, 2001). One might expect that the disturbance caused by the removal of limestone before 1975, and by the coppicing since, would have a stimulating effect on the population. This may still have been the case, but no evidence on this subject has been forthcoming from the study. However, the fact that the population has remained relatively constant over the study period suggests that it is healthy and viable, and has not declined since the site became an NNR.

Factors affecting nest survival

Observations made during the five years of the study have led to some general conclusions about *F. rufa* colonies:

(i) There is an old adage among beekeepers that "bees do not do anything invariably." The same seems to apply to wood ants. Exceptions can be found to every generalisation made about them. Nests do not usually survive when completely exposed to the elements, but occasionally one has been observed to do this (and it also occurs on Arnside Knott). Conversely, nests do not usually survive under closed canopy, but as early as 1991 Aldridge noticed that there were exceptions, and one nest has remained active under full canopy throughout the study period. Such nests have been observed on other sites. They are usually very tall and steep sided, and the key to their survival seems to be connection by a trail to a very good aphid tree which provides enough energy food to enable them to maintain the nest temperature without sunlight.

(ii) Colonies are as variable in behaviour, vigour and longevity as are the individuals of a non-social species. Some colonies are capable of moving the entire colony to a new site; this has been seen twice on the NNR. Others remain where they are as conditions deteriorate until they expire *in situ*, but usually not without having produced offshoot colonies. There is a natural variation in vigour between nests: some mounds are larger and visibly more active than others in similar situations. Some nests manage to persist in apparently unsuitable conditions, others have been seen to die for no apparent reason, with no observed change in their circumstances. There is also the curious phenomenon of 'sudden colony death' where a nest which was perfectly active one year is found to be totally devoid of ants the next. A possible explanation of this could be that the nest had become monogynous (most *F. rufa* nests are polygynous, i.e. contain numerous queens (Donisthorpe, 1915) and the queen had died.

(iii) Reoccupation of nests. An unexpected phenomenon, which complicates survey, is that occasionally an abandoned mound is re-occupied. This was observed on two occasions during the survey, and four nests reported as defunct in 1996 were found to be active in 2004. Presumably reoccupation happens when an offshoot of another nest chances to land on a convenient pile of nesting material. However, abandoned mounds are normally waterlogged, and occupation does not usually last more than a season or two, before a new nest is found nearby.

(iv) Use of chippings piles. On five occasions nests were found to have started in the surface layers of piles of wood chippings left by coppice operations. Two of these were removed with the chippings, but three remain (one after demolition of the original nest by a badger) and their development will be followed.

(v) Predation by woodpeckers and badgers. Green woodpeckers certainly eat a lot of ants, and it has been suggested (e.g. J. Pontin, pers. comm.) that if they are numerous in an area they can finish off a nest or even a population. This seems unlikely to be the case for normal nests. Woodpeckers do pick workers off the surface of nests and from trails. Their cigarette-butt like droppings, which consist largely of ant exoskeletons, are a common sight on nests. But it is not until the autumn when the workers begin to retreat underground that they start to attack nests, poking holes in the surface and scattering the material about – many nests are more or less flattened during the winter. This looks bad but is purely superficial and it is unlikely that it can make any significant impact on a nest with a population of several thousand workers. Nests which have been seen to expire may well have been moribund anyway.

Badgers can have a more serious impact on nests, sometimes scattering the mound and digging out the soil base, leaving visible claw marks, but the ants can respond by reorganising their nest nearby or on the original mound. This remarkable ability to reassemble their nests after demolition must have been an important factor enabling them to survive, and even possibly benefit from, the disruption caused during the era of limestone pavement removal.

Implications for conservation

In observations on the range of *F. rufa* populations in north west England (Robinson, 2001) it was concluded that absence of management had contributed to decline and demise in some cases, and that: 'Any management is better than no management'. The current study does not suggest that coppicing has brought about any increase in this population, but it is reasonable to conclude that it has helped to keep it in an active and healthy condition.

Acknowledgements

The author wishes to record his thanks to: Tony Aldridge who, when he was appointed Warden, prepared an accurate map of the Reserve from aerial photographs, which made sense of an otherwise extremely confusing situation, and then accurately mapped the wood ant nests. Without these two foundations this study would not have been possible. To Rob Petley-Jones, Site Manager and to English Nature/Natural England for access to the records and to the Reserve. To his wife Judith M. S. Robinson for technical advice in preparing the maps, and to his daughter Dr Elva J. H. Robinson for joining in preparation of this publication. The authors are grateful to the editor and referees for their encouraging and constructive comments.

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SHORT COMMUNICATION

Yellow form of *Evacanthus interruptus* (Hemiptera: Cicadellidae) in West Yorkshire. – In the description of *Evacanthus interruptus* (L.), Le Quesne (1965) mentions a rare polymorph lacking the characteristic black markings on the forewings. A female specimen of this type was found in low-altitude damp birch/oak woodland at Hebden Dale (SD 97263057) on August 17, 2008. It was beaten from Himalayan Balsam *Impatiens glandulifera* Royle, amongst wayside vegetation including ferns and grasses. No other specimens of *E. interruptus* were seen despite an intense search of the immediate locality.

The fore-body markings were typical for the species, and did not show any unusual reduction of dark colouration either on face or dorsum. The vertex had a pale median band, and the scutellum was barely marked, but these are not abnormal features. Similarly, the tibial spines showed the normal brown basal spots, and the abdomen was marked laterally by dark longitudinal bands. The pale background colour was, however, distinctly pinkish throughout, and deeper red on the pronotum and scutellum, rather than the typical yellow-grey. The specimen appeared to be of normal size, although it was not measured precisely.

There is currently little information available on the precise colouring of this polymorph, or its distribution, and any further records would be of interest. – JOE BOTTING, 42 Birkhouse Lane, Huddersfield, West Yorks. HD5 8BE.

REFERENCE

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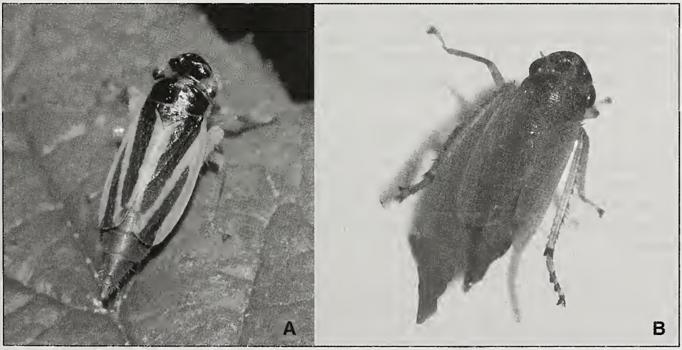

Fig. 1. *E. interruptus* females. (A), normal form; (B), yellow form. Colour image of B at: http://farm4. static.flickr.com/3135/2775709926_171f5f65ab_b.jpg

GNORIMUS NOBILIS (COLEOPTERA: SCARABAEIDAE) REDISCOVERED IN KENT AFTER 50 YEARS

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The last published record of *Gnorimus nobilis* (L.), the Noble Chafer, in Kent appears to have been in 1948, from Darenth Wood (Allen, 1949). However, both Eric Philp and Colin Johnson (pers. comm.) remember being shown live material by the late A. M. Massee in the late 1950s and/or early 1960s, although the precise dates and localities are not recorded. Matt Smith (pers. comm.) has checked the specimens in Massee's collection, now housed by the British Entomological & Natural History Society at Dinton Pastures Country Park, but only found specimens dated up to 1941. Massee had reared the beetle from larvae found in wood mould in hollow plum and apple trees in the East Malling area. Eric Philp also swept one from reeds at Stodmarsh (TR2261) on 11 July 1954, close to an old plum orchard which was subsequently grubbed out. The most recent precisely dated records are however two held by the Kent & Medway Biological Records Centre: Ditton Priory (TQ7158), 3 June 1956, and Holt Wood, Ditton (TQ7158), during the same month. These two records were made by D. W. Jenner and voucher specimens survive in his collection (J. S. Badmin, pers. comm.). Since then there have been no authenticated records from the county and it had been assumed that the species had become extinct locally through the widespread destruction of traditional orchards.

Noble Chafer was included amongst the first listing of Priority Species under the UK Biodiversity Action Plan and the People's Trust for Endangered Species (PTES) became the Lead Partner for the species. The PTES have subsequently been organizing specialist surveys within the former range of the species and have more recently launched a new project to map the remaining traditional orchards of England. It was through this new initiative that the first author and Steve Oram discovered the distinctive frass of Noble Chafer in an old traditional plum orchard at Iwade (TQ9067), near Sittingbourne, in September 2007. They found additional frass in an adjacent plum orchard. The main Iwade plum orchard is managed as the village park. It is to be hoped that the species survives in other orchards within the county but the lack of recent sightings suggests that it must be much localised.

ACKNOWLEDGEMENTS

Thanks to Eric Philp (Kent county recorder for Coleoptera), Colin Johnson, Matt Smith and John Badmin (Kent & Medway Biological Records Centre) for their help in compiling this report. We would also like to thank Laura Hurt of the People's Trust for Endangered Species for permission to make the details of the new record public.

REFERENCE

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NEW RECORDS OF THE SLENDER GROUND-HOPPER *TETRIX SUBULATA* (ORTHOPTERA: TETRIGIDAE) FROM YORKSHIRE

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ABSTRACT

Recent records of the ground-hopper *Tetrix subulata* (L.) from Yorkshire are summarised. Two colour forms were present. Many of the populations were on acid soils suggesting the species has a broad pH tolerance and may have been overlooked in habitats previously considered unsuitable. The possibility of range extension northwards in this species and the confounding effects of under recording are discussed.

INTRODUCTION

Tetrigidae (ground-hoppers, grouse locusts or pygmy grasshoppers) are a moderately diverse group of caeliferan Orthoptera characterised by their elongate pronotum, two-segmented pro- and mesotarsi and the absence of arolia between the tarsal claws. The family consists of around 270 genera in nine subfamilies and has an almost cosmopolitan distribution, though it is most diverse in the tropics. The genus *Tetrix* Latreille comprises some 118 species distributed throughout Europe, Asia and North America. In Europe, *Tetrix* is represented by nine species (Holst, 1986), only three of which are known from the British Isles; *T. ceperoi* (Bolivar), *T. subulata* (L.), and *T. undulata* (Sowerby). *Tetrix undulata* is the most common species and occurs across much of Britain and Ireland. It is readily identified by the prominent median keel on the pronotum, which does not extend beyond the apices of the metafemora. *Tetrix ceperoi* is restricted to coastal areas of southern England, the Channel Islands and a few localities in Hampshire, Cambridgeshire and southern Wales (Haes & Harding, 1997). This species has a much longer pronotum than *T. undulata* and is characterised by the wavy dorsal and ventral margins of the mesofemora. *Tetrix subulata* is generally larger and more robust than the aforementioned species and is further distinguished by a comparatively large interocular distance (*c.* 1.5 times eye width in males; *c.* 1.8 times eye width in females), lack of the pronotal keel and straight mesofemora. A key to the British species was presented by Marshall & Haes (1990) which was largely based on that of Ragge (1965).

Tetrix subulata was figured by Curtis (1825) and listed by Shaw (1889). A brief description and list of localities were given by Burr (1897), though the first detailed account of the species was provided by Lucas (1920) who noted that "*T. subulatus* [*sic*] is an uncommon insect in Britain . . . [but] it may only be awaiting investigators to put it on a much better footing" (p. 211). Burr (1936) later presented Watson-Praeger vice-county maps showing the distribution of *T. subulata* to be restricted to southernmost England and a single record from County Limerick, Ireland. In his landmark work on British Orthoptera, Ragge (1965) updated these maps, adding records for a number of additional vice-counties, including north and south Somerset, east and west Norfolk and north Lincolnshire, with the latter the most

northerly. Marshall & Haes (1990) added further vice-county records for north and south Wales, the Midlands and much of Ireland, and mentioned an 1837 record from the Thorne-Hatfield Moors area of Yorkshire (Skidmore, Limbert & Eversham, 1987). This record was later cited by Haes & Harding (1997) and Limbert (2004), with recent records of the species from localities north of the Humber reported by Chesmore (2005). Here we document several new Yorkshire localities for *T. subulata* and record the collection of voucher specimens from a population living on the outskirts of Sherburn-in-Elmet.

New records

Voucher specimens: *Tetrix subulata*, UNITED KINGDOM, North Yorkshire: 3 ♀♀, Selby District, Sherburn-in-Elmet, potato field east of Springfield Road, GR: SE499341, alt: 10 m, 1 ♀ 09.ix.2006, 2 ♀♀ 07.iv.2007, leg. S. W. Heads. Deposited in the Department of Entomology, The Yorkshire Museum, York.

Remarks. *Tetrix subulata* was most recently reported from Yorkshire by Chesmore (2005). Since then, the species has been recorded at several additional localities in south-east and mid-west Yorkshire (see Table 1 for a comprehensive list of all Yorkshire records). At the Sherburn-in-Elmet locality, two distinct colour morphs

Table 1. List of Yorkshire records for *Tetrix subulata*.

Date	Locality	Grid Ref.	VC	Recorder[3]
08.v.1998	Drax Power Station[1]	SE653282	64	DC
20.iv.2001	Drax Power Station[1]	SE653282	64	DC
02.v.2001	Broomfleet Ponds[1]	SE865283	61	PK
13.v.2001	Allerthorpe Wood[1]	SE762474	61	DC
19.v.2001	Allerthopre Wood[1]	SE762474	61	DC
20.v.2001	Saltmarshe Delph[1]	SE774248	61	PK
14.vi.2001	Eastrington[1]	SE785299	61	PK
11.viii.2001	North Duffield Carrs[1]	SE696358	61	PK
27.iii.2002	Drax Power Station[1]	SE653282	64	DC
13.ix.2003	Leconfield Carrs[1]	TA030435	61	DC
30.iii.2004	Bishop Wood[1]	SE555335	64	DC
25.iv.2004	Drax Power Station[1]	SE653282	64	DC
16.v.2004	Kiplingcotes Station[1]	SE903426	61	DC
08.vi.2004	Bishop Wood[1]	SE555335	64	DC
04.viii.2004	Holme on Spalding Moor[1]	SE770379	61	DC
03.iv.2005	Sherburn-in-Elmet	SE499341	64	SWH
12.v.2005	Skipwith Common	SE667384	61	JS
03.vi.2005	Skipwith Common	SE667384	61	DC
25.ix.2005	Drax Power Station	SE653282	64	DC
05.v.2006	Wheldrake Wood	SE668470	61	DC
09.v.2006	York University	SE622505	61	DC
26.vi.2006	Malham Tarn	SD893667	64	AS
09.ix.2006	Sherburn-in-Elmet[2]	SE499341	64	SWH
07.iv.2007	Sherburn-in-Elmet[2]	SE499341	64	SWH

[1]listed in Chesmore (2005)
[2]voucher specimens collected
[3]Initials of recorders are: AS, Alan Stewart, DC, David Chesmore, JS, Julian Small, PK, Peter Kendall, SWH, Sam W. Heads,

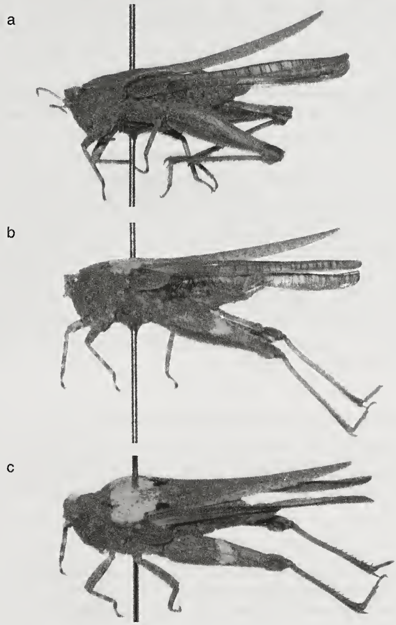

Fig. 1. Lateral view of *Tetrix subulata*. a, ♀ rufous brown colour morph (voucher specimen, Sherburn-in-Elmet, 07.iv.2007); b, ♀ spotted colour morph (voucher specimen, Sherburn-in-Elmet, 09.ix.2006); c, oblique dorsal view of b showing prominent triangular black spots on the pronotum.

are present: (1) a rufous brown morph with buff-coloured metafemora (Fig. 1a); and (2) a light brown morph characterised by a pale disc on the anterior part of the pronotum bordered posteriorly by two prominent black, triangular spots (Fig. 1b & 1c). The latter morph was referred to as var. *stylifer* by Lucas (1920), though a similar colouration is often encountered in other *Tetrix* species, including *T. ceperoi*, *T. undulata* and *T. bipunctata* (L.). At the Sherburn-in-Elmet locality, the rufous brown morph dominates with the lighter, spotted morph occurring only rarely. The population at Sherburn-in-Elmet appears to be well established, with specimens relatively common in the spring and summer. However, population size and stability have not been quantitatively assessed so collection of voucher specimens was limited to three females, taken over two consecutive years. Populations vary in size from one locality to the next, with the greatest numbers observed at Wheldrake Wood (SE668470) and Sherburn-in-Elmet (SE499341).

Discussion

From the data accumulated over the past 110 years, it would appear that *T. subulata* is extending its range northwards. However, given the relative paucity of records from the late nineteenth and early twentieth centuries, compared with the more comprehensive surveys characteristic of the latter half of the twentieth century (e.g. Ragge, 1965; see also Marshall & Haes, 1990 for a discussion of the Orthoptera Recording Scheme), it is difficult to distinguish between true and apparent (i.e. collection biased) distributions. Chesmore (2005) discussed the plausibility of a rapid northward expansion due to climate change, but noted that such an explanation was overly simplistic given the many other limiting factors involved (e.g. habitat loss, changes in land-use etc.). In addition, many of the Yorkshire localities are characterised by acid soils; a habitat previously thought to be unfavourable (Marshall & Haes, 1990). The discovery of well-established populations living on acid soils suggests that the species has a broader pH tolerance and may have been overlooked in habitats previously considered unsuitable. Given the potential ease with which *T. subulata* might disperse (individuals are strong fliers and capable swimmers) it is perhaps not unreasonable to predict its presence beyond the current documented range. It is possible, and indeed likely, that *T. subulata* is far more widespread than previously thought.

Acknowledgements

For their assistance in various ways, thanks go to Tina Heads, Pip Strang, Kevin Heads, Robert Crean, Peter Kendall, Julian Small and Alan Stewart. Partial support was provided by NERC grant NER/S/A/2004/14238 (to SWH).

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A NEW SPECIES OF *YURIPOPOVIA* (COLEORRHYNCHA: PROGONOCIMICIDAE) FROM THE EARLY CRETACEOUS OF THE ISLE OF WIGHT

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Abstract

A new species of *Yuripopovia* Jarzembowski (Coleorrhyncha: Progonocimicidae) is described from the Lower Cretaceous Vectis Formation (Wealden Group) of the Isle of Wight, southern England. *Yuripopovia vectense* **sp. nov.** differs from *Yuripopovia woottoni* Jarzembowski in the following characters: Sc undivided, branching from R basally; R_1, R_2 and RS evenly spaced; radio-medial cell apically sinuous and only slightly longer than the medial cell; and apical margins of medial and cubital cells off-set. A preliminary key to the species of Progonocimicidae from the Early Cretaceous of southern England is provided.

Introduction

Coleorrhyncha, or 'moss bugs', are a small group of obscure, cryptozoic Hemiptera widely considered to be the sister-group to Heteroptera (Fig. 1a). They are represented by a single living family, the Peloridiidae, with around 25 species in 13 genera restricted to temperate *Nothofagus* forests in Chile, Patagonia, eastern Australia, Tasmania, New Zealand, New Caledonia and Lord Howe Island (Grimaldi & Engel, 2005). Peloridiids are small (2–4 mm long) flattened insects with the eyes widely separated on short peduncles projecting laterally from the prognathous head; the pronotum is expanded laterally into broad paranotal lobes; the forewings are areolate and the hind wings are usually absent. As their vernacular name suggests, peloridiids live amongst wet mosses and liverworts and are most abundant in continually moist habitats characterised by high rainfall or humidity (Woodward, 1956). The modern distribution of Peloridiidae is a classic example of austral disjunction (Grimaldi & Engel, 2005) and the family was almost certainly effected by Gondwanan drift during the late Mesozoic. The taxonomy and biology of Peloridiidae was reviewed by Evans (1981), and their relationships discussed by Schlee (1969) and Popov & Shcherbakov (1996).

Fossil Coleorrhyncha are exceedingly rare. Peloridiidae are entirely unknown as fossils, perhaps due to their small size and cryptic habits, though their disjunct austral distribution suggests a Cretaceous origin. The only definitive fossil Coleorrhyncha are *Karabasia* (Karabasiidae) from the Late Jurassic–Early Cretaceous of eastern and central Asia, and *Hoploridium* (Hoploridiidae) from the Early Cretaceous of Siberia (Popov & Shcherbakov, 1996; Grimaldi & Engel, 2005). *Karabasia* and *Hoploridium* were placed along with Peloridiidae in the superfamily Peloridioidea by Popov & Shcherbakov (1996) based on the widened head, three-segmented antennae, free Sc, enlarged basal cell, longitudinal arculus and M_{3+4} fused with CuA_1 in the forewing. Popov & Shcherbakov (1996, p. 16) considered *Hoploridium* as a "blind off-shoot of the peloridioid lineage" (see also Bechly & Szwedo, 2007, fig. 11.53) though there are clear similarities between *Hoploridium* and Peloridiidae, including the entirely sclerotized metepisterna and the unarmed metathoracic legs with two-segmented tarsi. It is likely therefore, that *Hoploridium*

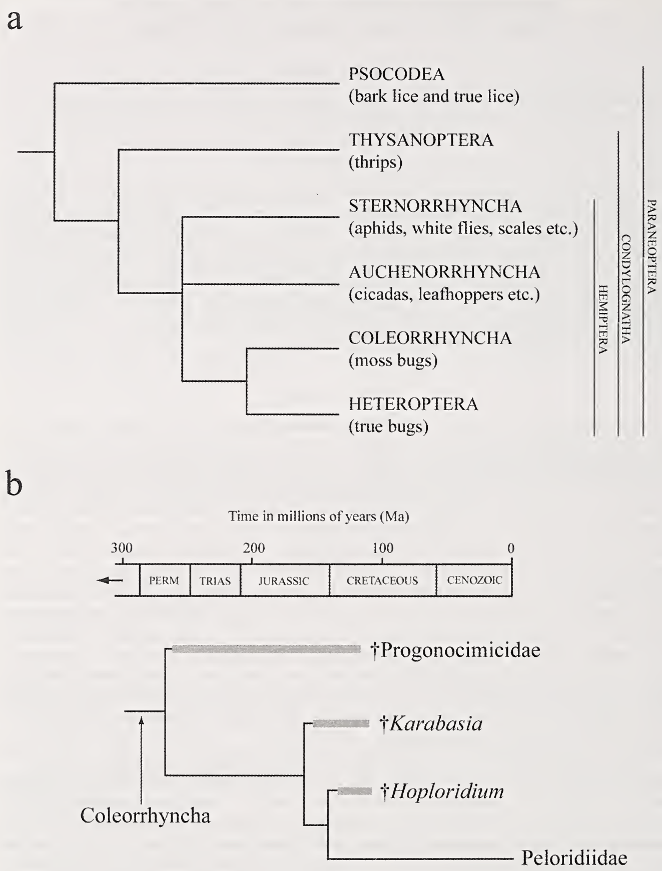

Fig. 1. Relationships of Coleorrhyncha. (a) phylogeny of Paraneoptera, showing the position of Coleorrhyncha within the Hemiptera. For an explanation of synapomorphies see Grimaldi & Engel, (2005). (b) phylogeny of Coleorrhyncha showing the likely relationships between the extant Peloridiidae and the various extinct groups. The thick grey lines indicate known geological ranges.

represents the sister-group to Peloridiidae as shown in Fig. 1b, further supporting a Cretaceous origin for the latter family.

Progonocimicidae are small to medium-sized stem-group Coleorrhyncha known from the Late Permian to mid-Cretaceous of Eurasia, Australia, Africa and South America. The family comprises around 18 genera and is subdivided into two subfamilies, Progonocimicinae and Cicadocorinae. Progonocimicids are primitive in general appearance and basal members of the family (e.g. *Actinoscytina*) are superficially similar to certain Ingruidae, though are more dorsoventrally flattened and (at least as far as is known) bear prominent lateral and apical metatibial spurs (Popov & Shcherbakov, 1996; Bechly & Szwedo, 2007). The monophyly of Progonocimicidae is doubtful (Grimaldi & Engel, 2005) and it is likely that the family constitutes a paraphyletic assemblage of stem-group Coleorrhyncha leading up to the clade comprising *Karabasia*, *Hoploridium* and Peloridiidae. Extensive revision of the family is required in order to elucidate their relationships and better understand the early evolution of the Coleorrhyncha.

Cretaceous fossil insects from the Isle of Wight

Fossil insects are relatively abundant in the Lower Cretaceous deposits of mainland southern England, but are rarer and generally not as well preserved in coeval strata on the Isle of Wight. Brodie (1853) mentioned the discovery by Edward Forbes of fossil insects in the 'Hastings Series' of the island (see also Goss, 1879), though this material was never described or illustrated and is today almost certainly lost. It was not until the early 1990s that Twitchett (1994) reported the discovery of insect fossils from the Vectis Formation (Wealden Group). Twitchett (*op. cit.*) briefly outlined the fauna and figured a selection of specimens, though he did not describe his material in detail and it was only recently that systematic work on the fauna began (Heads, 2005). Fossil insects are known to occur at several horizons within the Vectis Formation where they are preserved in a variety of lithologies including siderite nodules, organic-rich shales and well cemented fine-grained sandstone gutter casts (see Fig. 2). Insects are also known as inclusions in amber from the underlying Wessex Formation (Jarzembowski, 1995), which has also yielded termite borings preserved in fossil wood (Francis & Harland, 2006).

Twitchett's collection of fossil insects from the Vectis Formation, which is deposited in the Dinosaur Isle Museum (formerly the Museum of Isle of Wight Geology) at Sandown, along with additional material collected during the Geologists' Association Field Meeting of April 1993 was studied during the summer of 2003. During the course of this study, a number of interesting specimens came to light including a trichopteran larval case (Heads, 2005) and several isolated hemipteran tegmina. One of these specimens was assigned to the extinct family Progonocimicidae by Twitchett (1994) and is described here as a new species of the cicadocorine genus *Yuripopovia* Jarzembowski, 1991.

Systematic palaeontology

Family Progonocimicidae Handlirsch, 1906
Subfamily Cicadocorinae Becker-Migdisova, 1958
Genus *Yuripopovia* Jarzembowski, 1991

1991 *Yuripopovia* Jarzembowski, p. 99.

Type species. *Yuripopovia woottoni* Jarzembowski, 1991, by original designation.

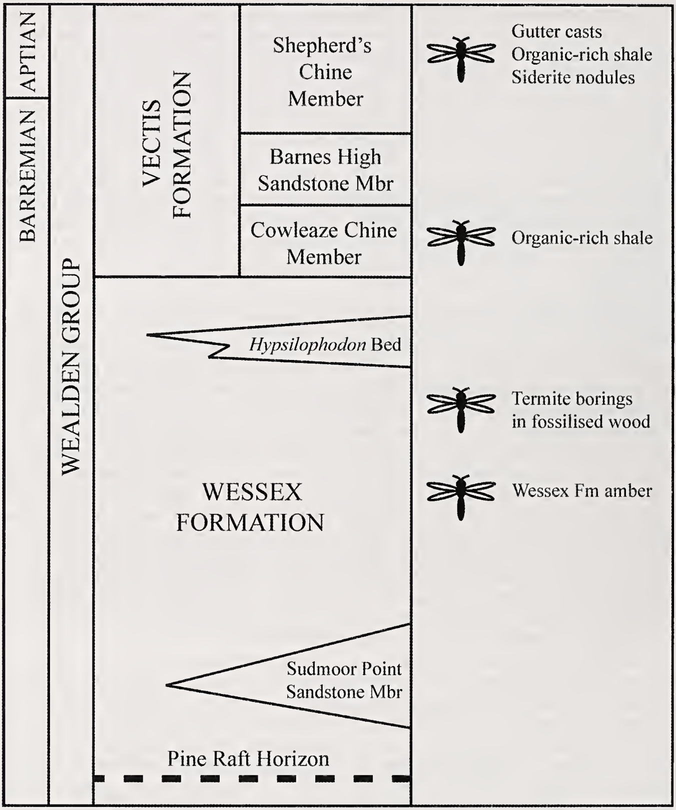

Fig. 2. Generalised stratigraphy of the Wealden Group on the Isle of Wight showing the stratigraphic distribution and lithology of insect-bearing units. The Early Cretaceous Wealden Group is represented on the Isle of Wight by two formations: the mostly fluvial Wessex Formation (Barremian) and the overlying, marginal marine Vectis Formation. The Vectis Formation is subdivided into three members: the Cowleaze Chine Member and the Shepherd's Chine Member are similar in overall lithology, comprising organic rich lacustrine clays and silts and are separated by the Barnes High Sandstone Member, comprising coarse grained sandstone. Note that vertical thicknesses are not drawn to scale (modified from Heads, 2005).

Remarks. *Yuripopovia* differs from all other Wealden Cicadocorinae in having a two branched R and a free RS; the latter is usually fused with M_1 at least basally. Vein Sc in the type species is remarkable in being three-branched (see Jarzembowski, 1991, Fig. 11), though this is apparently not the case in the new species (*vide infra*).

Yuripopovia vectense sp. nov.
Figure 3

1994 Progonocimicidae Twitchett, p. 49.

Holotype. MIWG 7090; isolated left tegmen preserved in a well-cemented sand-filled gutter cast; Upper Shepherd's Chine Member, Vectis Formation, Wealden Group; near Atherfield, Isle of Wight, 1992, leg. R. J. Twitchett. Dinosaur Isle Museum, Sandown, Isle of Wight.

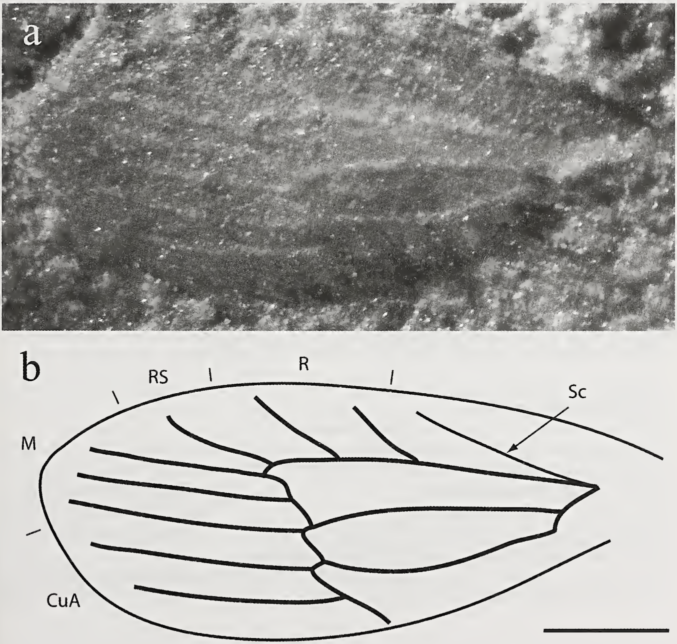

Fig. 3. *Yuripopovia vectense* sp. nov. (a) photograph of the holotype MIWG 7090; (b) camera lucida drawing of the holotype. Abbreviations for wing veins are as follows: Sc, subcosta; R, radius; RS, radial sector; M, media; CuA, anterior cubitus. Scale bar represents 1 mm.

Etymology. The specific epithet is derived from *Vectis*, the Graeco-Roman name for the Isle of Wight, which first appears in Ptolemy's *Geographia*, written around the mid 2nd Century AD.

Diagnosis. *Yuripopovia vectense* differs from its congener in the following characters: Sc undivided, branching from R + Sc stem near the apex of the basal cell; R_1, R_2 and RS evenly spaced; radio-medial cell sinuous apically, only slightly longer than medial cell. *Y. vectense* is further characterised by the off-set apical margins of the main cells.

Description. Tegmen 4.25 mm long; Sc weak, branching from R + Sc stem near apex of basal cell, confluent with the costal margin near mid-wing; R two-branched; R_1, R_2 and RS evenly spaced; rs-m_1 crossvein distinct; M with three closely spaced branches; radio-medial cell with sinuous apical margin; CuA two-branched; apical margins of medial and cubital cells off-set; the three main cells become progressively smaller posteriorly.

Remarks. Assignment of the new species to the genus *Yuripopovia* is supported by the presence of a two-branched R and a free RS (i.e. not fused with M_1). Interestingly, the three-branched Sc characteristic of *Y. woottoni* is absent in *Y. vectense*, which has a simple, undivided Sc more typical of the family. *Yuripopovia* is unusual amongst Cicadocorinae in the morphology of the radio-medial cell, which is elongate in *Y. woottoni* and apically sinuous in *Y. vectense*. The radio-medial cell is moderately elongate in *Cicadocoris* Becker-Migdisova, 1958 and *Heterojassus* Evans, 1961, but not to the same extent as in *Y. woottoni*. The unusual, sinuous apex of the radio-medial cell in *Y. vectense* is unknown in any other species and would appear to be unique.

Preliminary key to the Wealden Progonocimicidae

The following key allows identification of the six progonocimicid species that have been described to date from the Wealden Group (Klimaszewski & Popov, 1993). However, there are numerous undescribed taxa in the collections of the Natural History Museum in London, the Booth Museum in Brighton and the Maidstone Museum in Kent (E. A. Jarzembowski, pers. comm. 2008).

1. R with one branch 2
– R with two branches 5
2. RS fused with M_1 basally, but free distally 3
– RS fused with M_1 for its entire length 4
3. RS undivided distally . . . . *Valdiscytina jarzembowskii* Popov
– RS with two distal branches . . . . *Valdiscytina picta* Popov
4. M_2 closer to $RS + M_1$ than to M_3. . . . . *Ildavia shcherbakovi* Popov
– M branches more or less evenly spaced . . . . *Ildavia incompleta* Popov
5. Sc with three branches, radio-medial cell elongate
. . . . *Yuripopovia woottoni* Jarzembowski
– Sc simple, radio-medial cell apically sinuous. . . . . . . *Yuripopovia vectense* Heads

Acknowledgements

The author is very grateful to Tina Heads for her unwavering support and encouragement. Many thanks also go to Rob Crean, Dave Martill, Bob Loveridge, Mike Barker, Dan Pemberton, Martin Munt, Richard Twitchett, Andrew Ross, Ed

Jarzembowski and the late Dave Kemp. Partial support was provided by NERC grant NER/S/A/2004/14238.

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SHORT COMMUNICATION

Recent record of *Nomada fucata* (Panzer) (Hymenoptera: Apidae) new for the Isles of Scilly. – During the period of 5.vii.2008 to the 18.vii.2008 the island of St. Martin's, Isles of Scilly (VC1) was visited as part of a lottery-funded joint project between Surrey Wildlife Trust (SWT) and the Zoological Society of London (ZSL) concerning the RDB1 ant *Formica rufibarbis* Fabr. Part of the remit was to sample other invertebrates occurring within the habitats utilised by *F. rufibarbis*.

A number of aculeates were sampled including *Andrena flavipes* Panzer, the host species of *N. fucata*. *Andrena flavipes* itself is only a recent arrival to the islands, being first recorded from St. Mary's in 1997 (Beavis, 2000). Small numbers of males were later recorded from both Tresco and St. Martin's during 2003 (Beavis, 2005). *A. flavipes* is now apparently established on St. Martin's with female nesting activity being observed alongside the south-eastern coastal path of Chapel Down (SV943156).

On the 12 July, a single male of *N. fucata* was taken in this vicinity, being swept in flight from above mixed communities of maritime heath, which although not clear cut, are closest to H7 *Calluna vulgaris* – *Scilla verna* heathland with *Armeria* sub-community (Rodwell, 1991, 2000) which is characteristic of the Scillonian cliffs (Parslow, 2007). Although *N. fucata* is recorded from the mainland in VC1 this is apparently the first record of this cuckoo species for the Isles of Scilly (Beavis, pers. comm.).

This species is listed as Nationally Scarce A (Notable A) in Falk (1991). However, according to Edwards and Telfer (2002), its current abundance suggests that this status should be revised. – SCOTTY DODD, 1 Pine Cottages, Harpers Road, Ash, Surrey, GU12 6BZ

ACKNOWLEDGEMENTS

The author would like to thank Dr. Ian Beavis, Tunbridge Wells Museum & Art Gallery, for his assistance in providing copies of his papers on the Hymenoptera of the Isles of Scilly, for confirming the identification of the voucher specimen and finally commenting on a draft of this article. Thanks also to the Heritage Lottery Fund for funding the overall project, ZSL, SWT & the Isles of Scilly Wildlife Trust for supporting this work.

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MOTHS ON THE MAP: THE NATIONAL MOTH RECORDING SCHEME

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Introduction

Since the last report (*British Journal of Entomology and Natural History* **21**: 54–56), the National Moth Recording Scheme (NMRS) has made great strides in collating vice-county datasets of moth records and in making important historical datasets available. This article provides a brief update, as well as some early provisional distribution maps from the new recording scheme.

More than 50 Counties in!

The NMRS database now contains 3.8 million records from 53 vice-counties, just under half of the UK. Over the past few months County Moth Recorders have been submitting their local datasets to the NMRS, enabling the production of the first provisional distribution maps! The dark areas on the map below (Fig.1) show the vice-county datasets in the NMRS database to-date and our great thanks are due to all the County Moth Recorders and individual lepidopterists involved. The remaining datasets are awaited once County Moth Recorders have completed input, verification and formatting of their records.

The general level of recording effort can be assessed by examining the provisional map for the Silver Y *Autographa gamma* (L.) (Fig. 2). Due to the widespread and common status of this moth, we can see how active moth recording is. In the vice-counties that we have datasets for, the absence of this moth from a 10 km square may indicate low levels of recording. The provisional distribution map from the NMRS database for the Figure of Eight *Diloba caeruleocephala* (L.) (Fig.3) shows a clear and marked decline, mirroring the 95% population decrease recorded by the Rothamsted light-trap network (1968–2002) and reported in *The State of Britain's Larger Moths* report.

Making historical data available

The Moths Count team has been working to make two major national datasets of moth records available both to County Moth Recorders and, ultimately, to the NMRS itself. Currently, an estimated 10 million moth records from the Rothamsted light-trap network are being repatriated to County Recorders. So far, one-third of these data have been forwarded to the relevant County Recorders. Prior to incorporation into their local datasets, County Moth Recorders will validate the records. We are very grateful to Rothamsted Research and Ian Woiwod in particular, for this contribution to the NMRS.

In addition, the Biological Records Centre (BRC) has computerised over 600,000 records from the previous Lepidoptera Recording Scheme which ran from 1967–1982 (Fig. 4). The BRC went back to basics and, as a contribution to the NMRS, have computerised all of the information from 19,106 original record cards which were sent in to the scheme run by John Heath. These historical record cards, which, if

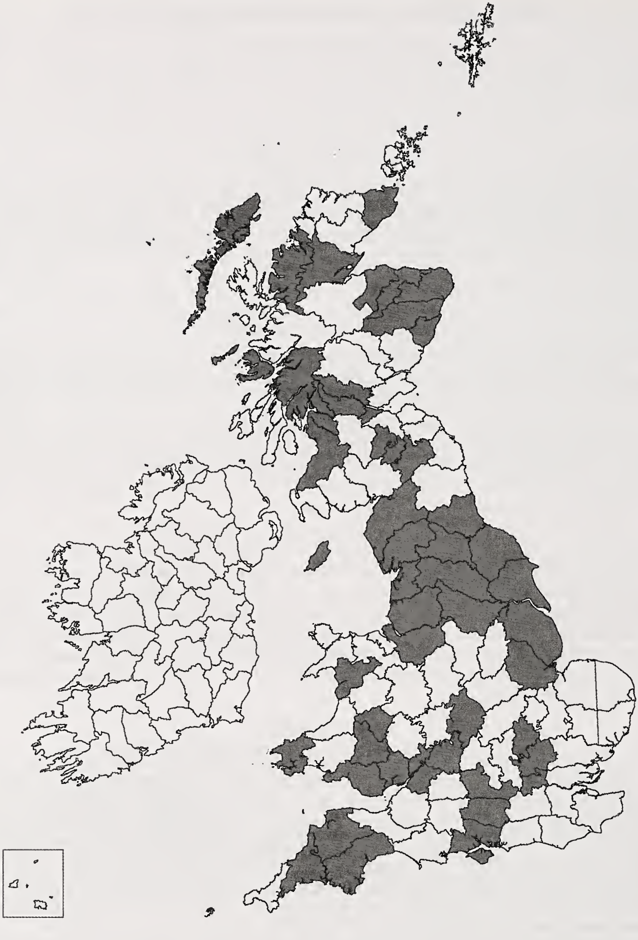

Figure 1 Vice-county datasets incorporated into the NMRS database by November 2008.

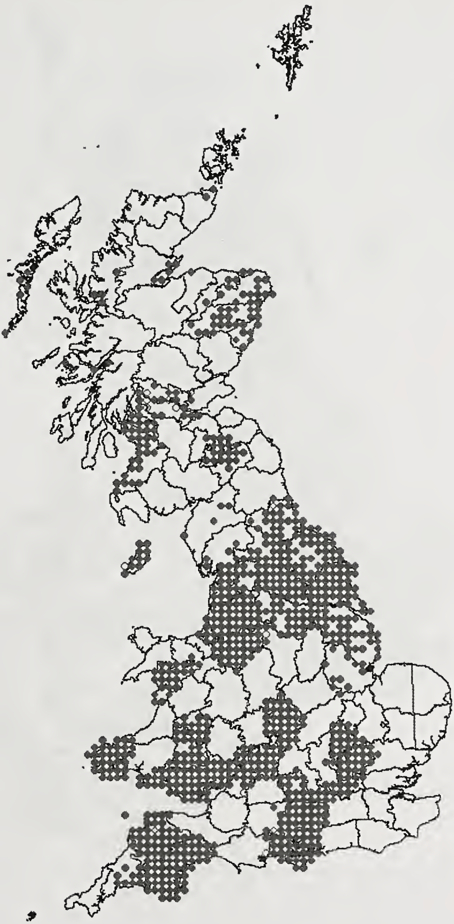

Figure 2. NMRS provisional distribution map of the Silver Y at 10km square resolution, showing a high level of recording coverage for the 53 vice-county datasets in the database to-date.
Pre-1995 ○; Post-1995 ●

Figure 3. NMRS provisional distribution map of the Figure of Eight. The population of this moth has declined by 95% since the late 1960s. This decline is also reflected by the absence of the moth in previously recorded 10km squares.
Pre-1995 ○; Post-1995 ●

Figure 4. Number of macro-moth records per 10 km square in the BRC historical moth dataset from 1967–1982 (map produced by Steph Ames).

put end to end, would be the length of 399 double-decker buses, will be available to the NMRS and to County Moth Recorders. This new BRC dataset, which took approximately 400 hours to computerise, contains records for 863 macro-moth species (Fig. 5) with an impressive 84% coverage of Britain, the Isle of Man and the Channel Islands at the 10km square level! We shall be receiving the BRC dataset within the next few months and will be repatriating the records appropriately.

Although these records were computerised in the past for *The Moths and Butterflies of Great Britain and Ireland* (MoGBI) series of books, they were only captured at 10km square resolution, thereby losing much useful and important

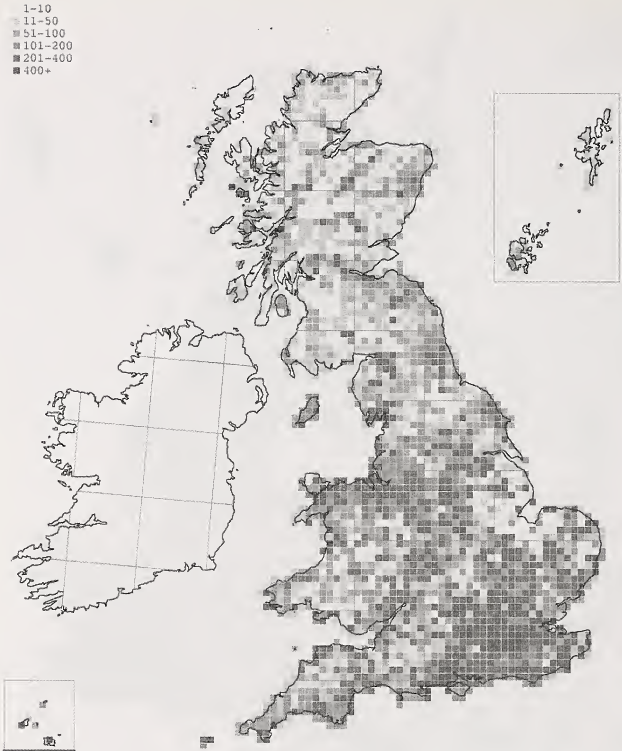

Figure 5. Number of macro-moth species recorded per 10 km square in the BRC historical moth dataset from 1967-1982 (map produced by Steph Ames).

information. The MoGBI volume covering the Geometridae has not yet been produced so there have never been any published maps for the group, which accounts for 34% of UK macro-moth species. The Moths Count team would like to pass on huge thanks to Dr. Mark Hill and his team for this fantastic achievement and valuable contribution towards county datasets and the NMRS.

These historical datasets are very important to the NMRS; they provide a base-line to enable accurate assessment of species distribution change. Additionally they will highlight 'white holes' where recording effort is low and, therefore, encourage targeted recording of these under-recorded areas. Last but not least, it will make the

most of all the hard work put in by the moth recorders who took part in the original scheme.

Other developments

In the near future, we will be generating provisional online distribution maps for nearly all species of macro-moths via the Moths Count website *www.mothscount.org*. These distribution maps will provide the first update for decades for many species, and the first maps ever for the Geometridae. We expect them to show a fascinating variety of range expansions, retractions and shifts in species distributions, as well as the effects of increased recording coverage filling in previously unrecorded areas. The provisional distribution maps will be regularly updated and will provide useful information and feedback to moth recorders. Additionally, moth recorders will be able to view their moth records in wider context.

The second English Moth Recorders' Conference will be held on Saturday 31 January 2009 at the Birmingham and Midland Institute in central Birmingham. This is a great opportunity for moth recorders to be updated on the Moths Count project and the NMRS, meet fellow moth recorders and share moth recording experiences. We are delighted to have Dr Tim Sparks amongst several other guest speakers. Further details and a programme of the day will be advertised shortly. This is a free event which includes tea, coffee and lunch, but places are limited. Pre-booking is essential by contacting *nmrs@butterfly-conservation.org* or 01929 406009.

BOOK REVIEW

Ants of New Zealand by Warwick Don. (Otago University Press, 2007). 239pp. Hard cover £32.50. ISBN 9781877372476.

This splendid book is the latest volume to consider the taxonomy and biology of the ants of a particular country or region. It covers a fauna that has not been the subject of a comprehensive study since W. L. Brown reviewed the ants of New Zealand in 1958 (*Acta Hymenopterologica* **1**: 1–50, freely available at www.antbase.org/), and that has seen many recent changes.

The main text is divided into five chapters. These provide an introduction to myrmecology and to the New Zealand ant fauna, an identification key to workers, individual species accounts, advice on how to study ants and short profiles of four myrmecologists whose work has embraced New Zealand ants. They are preceded by a foreward by E. O. Wilson and the author's preface, and followed by a glossary, list of cited papers and websites, and index. Maps of New Zealand's North and South Islands, showing ant collecting areas and some of the localities mentioned in the text, appear on the two final pages. The wealth of information contained in this book has been gleaned from a wide range of sources representing the last 150 years or so, including the author's own work and observations. Taxonomic treatment is up to date. The standard of presentation is high, from the clearly set out contents pages, through the attractive and uncluttered main body of the book with its numerous plates and figures, to the comprehensive index. Moreover, the author moves easily between a rigorous telegraphic style and concise, easy-to-read description, as appropriate.

The wide-ranging introduction to ants in chapter 1 covers evolution, classification, external morphology and general biology, as well as the origins of the New Zealand fauna. Usefully, it includes a checklist of the 11 endemic and 38 introduced ant species that have been recorded in New Zealand. Importantly, it ensures that the following identification key can be used, and the species accounts fully appreciated, by anyone with an established interest in the natural world regardless of their previous knowledge of ants.

All of the currently recognised endemics and established introductions are covered by the parallel dichotomous key to workers that comprises chapter 2. Together with the checklist and species accounts this key gives the book its specialist value. The succinct text is supported not only by figures illustrating worker anatomy in chapter 1, images that accompany the species accounts in chapter 3, and the glossary, but also by 50 clearly drawn key figures with relevant characters arrowed. Each of the latter is conveniently placed within the key immediately following the appropriate couplet, with the majority presented in pairs to illustrate contrasting character states. Key length is favourable, with the number of couplets that must be used to identify a species falling between three and nine. Notwithstanding the fact that many couplets use only a single character, the key appears to be straightforward given specimens in reasonable condition.

An account for each of the ants on the checklist, together with notes on each of the nine families and 28 genera that they represent, occupy chapter 3's 146 pages. The species accounts are grouped together in accordance with distinctions already made in the checklist between ants that are endemics or established introductions (11 and 24 species, respectively), of doubtful establishment (eight species) or recent arrivals (six species). Those for endemics and established introductions are the most detailed. Each of these contains a New Zealand distribution map, also sections on the species' origin and distribution, general biology, pest status and, except for the workerless inquiline, *Strumigenys xenos* Brown, diagnostic characters for the worker and a colour image of the worker in lateral view. Taxonomic notes are included for several species and record details are listed for some of the exotics. Altogether, the taxon accounts are a valuable reference, well-supported by literature citations, that not only summarises current knowledge of New Zealand ants, but also highlights some of the gaps in our understanding.

In anticipation that this book might inspire some of its readers to look more closely at ants, and perhaps contribute to plugging some of these gaps, chapter 4 encourages the budding myrmecologist by offering sound advice on the field collection, preservation, mounting and culture of ants.

Despite the disappointing lack of attention paid to identification of either male or female castes, *Ants of New Zealand* is a book of great merit that deserves a wide audience. The author has produced a scholarly standard work that is not only an essential specialist reference but also an accessible and stimulating read for anyone with an interest in ants and whose curiosity extends beyond their immediate surroundings.

Glenda Orledge

SHORT COMMUNICATIONS

Records of *Cimbex connatus* (Hymenoptera: Cimbicidae) in East Yorkshire – A fully grown larva of *Cimbex connatus* (Schrank) was found on an Italian alder tree (*Alnus cordata* Nutt.) close to the Sainsbury's supermarket in Pocklington, East Yorkshire (SE 803486) (VC61) on 17 September 2008 (Fig. 1). A further five larvae were recorded at the same location two days later; three larvae were kept for rearing and have subsequently pupated.

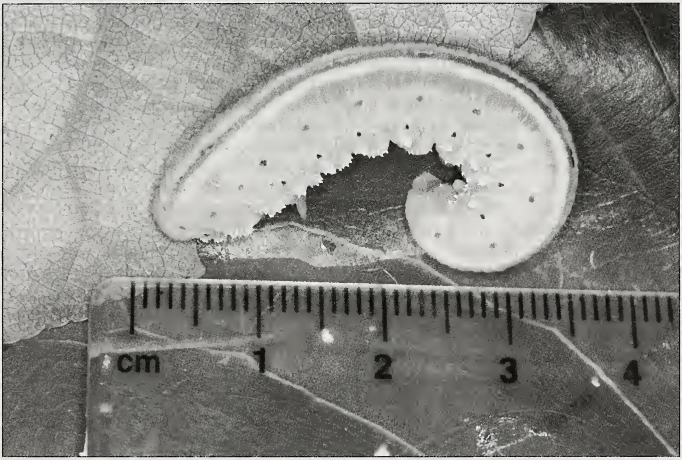

Fig. 1. Larva of the sawfly *Cimbex connatus*, Pocklington, East Yorkshire, 2008.

Historically, this species was considered to be very rare in Britain and possibly extinct after 1947. The insect is univoltine, flying in July and August. The larva feeds on *Alnus* spp. It is present throughout most of continental Europe but not common. The only record for Yorkshire that could be located was in the Yorkshire Naturalists' Union (YNU) Transactions for 1877, which states that Mr Robert Cook of York had one specimen in his collection which was taken in Heslington, York on 28 May 1834 (J. Coldwell, YNU Symphyta Recorder, *pers comm.*). However, it appears that there have been several recent records in VC61 in 2007 and 2008, all associated with *Alnus cordata* (M. Boddington, *pers comms.*). In discussion with Andrew Halstead of the Royal Horticultural Society, it seems that the recent sightings of this species may be a result of unintentional introductions with imported nursery stock. – DAVID CHESMORE, 39 Hawthorn Drive, Holme on Spalding Moor, East Yorkshire, YO43 4HX.

***Leptotes pirithous* (Lepidoptera: Lycaenidae) now well established on the island of Madeira.** – An authoritative list of the butterfly species of Madeira published in this journal (Salmon & Wakeham-Dawson, 1999) served as my field guide for a trip to the island 4–11 June 2008. The species list is interesting for its endemics, but not for its length – the 1999 list totals just 19, including one extinct species and four doubtful records. The only Lycaenidae listed are *Lycaena phlaeas phlaeoides* (Staudinger) and *Lampides boeticus* L. (Small Copper and Long-tailed Blue, respectively). On 6 June, our second full day there, *Leptotes pirithous* (L.) (Lang's Short-tailed Blue) was spotted, recognised, and photographed in a public garden in Funchal. To find a butterfly apparently new to the island created a flutter of excitement, although it later transpired that it had been found in 2001. This note presents a few observations on its establishment on the Madeiran island group.

The type-locality of *L. pirithous* is Algeria; it is widespread and common in North Africa, distributed around the Mediterranean coastline and into southern Europe as an acknowledged migrant (Tolman & Lewington, 1997). Tolman adds "Not recorded from the Atlantic Islands", which was indeed the case in 1997. In recent decades it has become more common around the Mediterranean, and in Cyprus, its recent spread is attributed to the growing of lucerne (*Medicago sativa*), one of its many larval host plants (E. John & C. Makris, pers. comm.). By 1998, it had reached the Canary Islands (Franquinho Aguiar & Karsholt, 2006).

It was not found on Madeira in the six visits made by Wakeham-Dawson during 1997 to 1999, but in August 2001 was found to be common in the botanic gardens above Funchal, and well inland at four sites above and below Poiso, between 1400 and 1450m (Hall & Russell, 2001). It might well have arrived naturally from North Africa with the wind, possibly staging through the Canaries, but accidental importation with cargo is equally plausible. In October of the same year, Wakeham-Dawson found it on Porto Santo – another island in the Madeira group, about 15 miles to the north east (Wakeham-Dawson, Salmon & Franquinho Aguiar, 2002), although he failed to find it again when he returned there in July 2002 (Wakeham-Dawson & Franquinho Aguiar, 2003).

Personal sightings in 2008 were all in public gardens in Funchal.

(1) The Parque de Sta Catarina, which lies in central Funchal, directly inland from the harbour. *Leptotes pirithous* was first sighted flitting over grass on the southern fringe of the gardens, settling on white clover, and engaged in courtship (like most of the humans in this peripheral area of the park). Returning in better weather on 9 June, at least 27 were found along the same terraces. They associated with clovers, toothed medick (*Medicago polymorpha*) and pitch trefoil (*Psoralea bituminosa*) growing at the top of a floral embankment. The more extensive recreational grass areas were shorter mown, with fewer vetches and trefoils; just three more *L. pirithous* were flying here.

(2) The exotic gardens of the Presidential Palace lie adjacent to the Parque de Sta Caterina, and are open to visitors. It was a surprise to find a further three *L. pirithous* there, fluttering around the flowers of a tropical shrub *Caesalpinia pulcherrima*.

(3) Quinta Magnolia, a small park about a kilometre further west, where another, smaller colony was found. In a grassy area with plenty of white clover, six or eight lycaenids were flying more actively, as the day was now warmer. At least two of these were *L. pirithous*, whilst at least another two were *L. boeticus*.

It would appear that this species is now properly established in a number of colonies on Madeira, and is likely to remain as a continuously-brooded resident. Much of the island's core is too high, but ample areas of suitable habitat exist in fragmented valleys, where plenty of Fabaceae are to be found as larval host plants. Hall & Russell (op. cit.) found it flying in sheltered hollows around gorse bushes

(*Ulex europaeus*) – a very natural setting compared with the parks in which it was found in 2008. Because the butterfly is superficially similar to *L. boeticus*, and could easily be overlooked by casual observers, it seems quite possible that it had been present for some time before Russell and Hall found it at Poiso.

In a well-visited location like Funchal, its spread is likely to be well monitored, and I have subsequently discovered that Crook also saw it in two Funchal parks during a visit in May 2007. Like me, he thought that he had found a new species for the island (Crook, 2007; website images). One of his parks, de Sta Caterina, was the same as mine; his second was Jardim de Sao Francisco, a small but attractive garden square in the town centre. I had looked there, but not found it. This brings to five the number of Funchal town parks supporting *L. pirithous*. The Funchal Ecological Park is quite separate. It lies outside the town, at a higher elevation, and was the subject of a conservation article (Wakeham-Dawson & Warren, 1998), where the habitat is more natural.

Until my return, I was blissfully unaware that since the arrival of *L. pirithous,* a check-list of the butterflies of Macaronesia (Canary Islands, Madeira, Azores) had been published (Tennent, 2005), that the Lepidoptera of the island group had been comprehensively catalogued (Franquinho Aguiar & Karsholt, 2006), and that the species had already been accepted as established on Madeira. Tennent visited the island in August 2003, and found *L. pirithous* widespread on the Encumeada Pass and the Areeida Massif up to 1460 m, flying with larger numbers of *L. boeticus*, (Tennent, pers. comm.).

It is worth noting that another butterfly added to the Madeira list in 1999, *Catopsilia florella* Fabr. (the African Migrant), did not put in an appearance during our stay. This is significant, as doubt has been placed on its capacity to become a resident (Franquinho Aguiar & Karsholt, op. cit.). The Geranium Bronze (*Cacyreus marshalli* (Butler)) is another post 2001 addition to the Madeira list (Wakeham-Dawson & Franquinho Aguiar, 2003), and I did not see that either.

My thanks to Andrew Wakeham-Dawson, David Hall, Peter Russell, John Tennent, Eddie John and Norman Hall, all of whom have assisted in the compilation of these notes. Peter Russell suspects that a thorough search of likely spots will reveal *L. pirithous* to be quite common on the island now. – R. PARKER, 66 Cornfield Road, Bury St Edmunds, Suffolk IP33 3BN. *robparker@waitrose.com*

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Nomads of the wind, by Ingo Arndt, Claus-Peter Lieckfeld & Peter Huemer. Papadakis, 2008. Hardback, ISBN 9781901092929. £20.00 (£18.00 direct from publisher).

The first section of this book deals with the story of the Monarch Butterfly's migration through North America either side of its hibernation in the mountains of Mexico. The second section, entitled 'Other wonders of the Butterfly World' is a series of photographs of various Lepidoptera (moths as well as butterflies), in different stages, each illustrating some aspect of their biology.

The immediate, and over-riding, impression of this book is the quality of the photography. So often insects are photographed with flash, leading to images that may capture a moment, yet have a harsh, unattractive quality. Ingo Arndt avoids this pitfall, in some cases through using natural light, in others through careful use of artificial light sources. As a result, browsing through this book is both an entomological and an artistic pleasure.

The migration of the Monarch, culminating in their gathering by the million in the Mexican forests, is one of nature's greatest spectacles. It is done full pictorial justice in this book. The accompanying text tells the generic story of a single butterfly's journey to Mexico from Wisconsin in the northern USA. It follows the butterfly through the winter hibernation and then on its journey north again in the spring, through to the production of its offspring which will continue the long journey back to northern USA and Canada. This tale is particularly interesting since the authors have interwoven details of current scientific work to map and explain this extraordinary feat of migration. It also includes details of the greatest environmental threat facing the hibernation spectacle, illegal logging, and the efforts by local people at re-forestation.

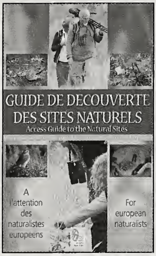
The Monarch section really seems like a book in itself. The 'other wonders' section has a different feel, more that of a coffee-table book. The photography, while still of excellent quality, is generally more 'staged'. Each photograph is accompanied by a short paragraph of text to illustrate topics such as 'the bravest' (Death's Head Hawk Moth), 'the super sniffer' (Giant Peacock Moth) and 'the pseudo-sting' (Hornet Clearwing). The brevity of this text feels somewhat simplistic in contrast to the detail of that in the first section of the book.

This second section might be viewed in two ways. On the one hand it feels like a less focussed digression into the broader lepidopteran world. On the other hand it might be taken as a free extra. I prefer the latter option since it is a pleasure to browse through and some of the extreme close-up shots of caterpillars and the surfaces of butterfly and moth wings are outstanding.

The quality of the paper and the printing of the photographs are excellent and at £20 this book offers excellent value. I would recommend it as the best and most beautiful telling of one of the greatest stories of the insect world.

Rupert Barrington

BOOK REVIEWS



GUIDE DE DECOURVERTE DES SITES NATURELS (Access guide to the Natural Sites). – Parc Naturel Regional des Caps et Marais d'Opale.

Edited by Thierry Mougey *et al.*, translated by G. Marchais, B. Bullen & D. Tuson. (PNR Caps et Marais d'Opale, 2006). 80pp.

This recently translated booklet is a guide to the main wildlife conservation areas in the Calais – Boulogne region of France just 20 miles east of Kent. The new Parc was created in March 2000 by merging the Parc de Boulonnais and Parc d'Audomarois covering an area of more than 130,000 ha and a population of 186,000 inhabitants. The Conservatory ('Wildlife Trust') for the region was formed about 15 years ago with the aim of protecting local biodiversity by (i) improving awareness in the environment of the region by undertaking biological and ecological surveys, (ii) protecting valuable natural sites by purchase or cooperation with site owners, (iii) developing and implementing appropriate management plans and (iv) raising the public's awareness of their natural heritage (as most sites are freely open to the public). The location of each of the 42 wildlife sites in the region is shown on an introductory map; the site number corresponding to the page number describing the site in more detail. Site order in the booklet is by general habitat type: shoreline environments (sands, dunes, shingle, saltmarsh, cliffs); forests, chalk downland, wetlands and a single heathland site, the Plateau d'Helfaut.

For each site, there is at least one detailed habitat and footpath map and several colour photographs showing the lie of the land. These are particularly well chosen and depict the areas realistically (based on my somewhat limited knowledge of the region). Biological data are summarised in a neat way. The number of taxa for each major grouping is shown pictorially as a banner headline across the page: there are symbols for flowering plants, fungi, mammals, birds, amphibians, reptiles and insects and others that includes minor groups such as spiders, fish and molluscs. Underneath the species number for each taxa grouping, there is a dial indicating how well the site has been studied. For example, at the Dunes et forêt d'Ecault, 458 flowering plant species have been recorded and the dial indicates that this probably represents ca. 90% of the likely flora. The full list for insects is not given (though Lepidoptera – 208, Coleoptera – 109 species are listed) and the dial optimistically points to ca. 50% coverage of the expected total. More details of the important features of each site are described in the accompanying text. This includes useful information such as times when hunting and shooting are likely to take place.

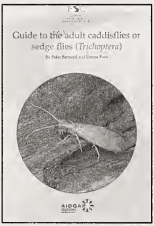
This main section of the book finishes with a couple of pages headed 'What to do with your records?' Visitors are encouraged to submit their field records to a number of local and national recording societies so that the data are not lost and in some cases to submit them via downloadable recording forms. This seems an eminently sensible approach and should ensure that site records are kept up to date and highlight those sites that are under-recorded. I note that two sites apparently have no insect records despite comprehensive lists of flowering plants; so these should be visited by entomologists.

The booklet concludes with a pull-out section of colour photographs of notable animal and plant species found in the region and a key to the maps and taxa groups.

It was here that I finally discovered what I thought was the symbol for fluffy evergreen trees was in fact the symbol for mosses and lichens, though I had an inkling this might be the case, simply by omission.

Members of the Kent Field Club and other local recording organisations in conjunction with the Kent & Medway Biological Records Centre have made very productive visits to this region to assist our French counterparts in biological recording, as part of an EU-funded Project. The booklet is available free from the Parc Naturel Regional des Caps et Marais d'Opale (e-mail: info@parc-opale.fr, web: www.parc-opale.fr) and the Kent & Medway Biological Records Centre (e-mail: info@kmbrc.org.uk, web: www.kmbrc.org.uk). Both Thierry Mougey and Guillaume Marchais (among many) are to be congratulated on producing a very informative booklet about the region's wildlife sites. It is amazing to realise that former Kent rarities such as the Glanville Fritillary butterfly, last recorded in the county in 1863, occur in numbers just a few miles away over in France.

John Badmin



Guide to the adult caddisflies or sedge flies (Trichoptera) by Peter Barnard & Emma Ross (2008). Field Studies Council, OP129. Price: £3.50.

This is the latest addition to the AIDGAP series produced by the Field Studies Council and covers an Order of insects that has never quite made it to the big time despite valiant attempts in the past. Adult caddisflies, also known as sedge flies, are well known to fly fishermen, who imitate them with artificial flies. Moth recorders are also familiar with the group, finding some species in their light-traps.

The new guide is a great improvement over the test version (*BJENH* **20**: 117) circulated two years ago. There are substantially more colour photographs of representative species from each family, together with information on their habitats, flight period, wing length and other useful identification characters. The provisional key that extended over four pages has been replaced by more informative text and a summary table listing family and generic diagnostic features (i.e. number of spurs on the legs, presence of ocelli, number of palp segments). In fold-out chart format, this guide is small enough to put in a rucksack (folds to B5 size – approx. 24×18 cm/10 in $\times$ 6.5 in) and has a splash-proof laminated coating for protection in the field.

The authors' intention is to encourage (technically to spur on) readers to develop an interest in this group of aquatic insects and an extensive list of further references is included for this purpose. If you aspire to keys to adults, Macan (1973) is your best bet, but how any organisation could publish a key without any accompanying biological information is mystifying. There is no confirmatory text to indicate whether a species occurs in ponds or fast-flowing streams, is local or widespread, or occurs only in Scotland or south-west England. The present authors indicate that a new key to British adult caddis is being prepared, and I for one, cannot wait. Meanwhile learn your families with this excellent guide.

John Badmin

THE SOCIETY'S PUBLIC LIABILITY INSURANCE

In 1997 the Society extended its third party liability insurance for cover in respect of official Society events to include field work carried out by members as part of their personal activities. It was expected that this would cover the insurance obligations, which accompany applications for collecting and recording permits in many cases.

The Society has received a number of queries regarding the scope of the cover provided and this notice will hopefully clarify the position.

At events arranged by the Society and its sister organisations, Dipterists' Forum, BMIG, and BWARS, public liability insurance is in place which covers injury and damage to third parties arising from the activities of members and guests. Events include both field meetings and indoor events such as workshops and exhibitions. The cover provided is £5,000,000. It is important that permits for field meetings are issued in the name of the Society, or sister organisation, or to an individual on behalf of the Society, not in the name of the leader of the meeting.

The Society's insurance policy also provides £5,000,000 of public liability insurance to individual members of the Society and sister organisations, in respect of their own field work and entomological research which is not part of a Society activity, providing this is undertaken in the United Kingdom and is not carried out with a view to financial reward.

Members who are contemplating carrying out field work on a paid basis are specifically excluded from this cover. We have now procured an arrangement by which such members can approach our brokers directly to obtain individual third party liability cover under our policy. This will incur the payment of an additional premium by the member concerned. We understand this will result in a very marked saving compared with obtaining this cover through a fresh policy.

We must emphasise that the cover referred to above is Public Liability Insurance and does not include Professional Indemnity, for which separate arrangements have to be made.

The Society's insurance policy number is,

Royal Insurance H2/RKE274258-7.

Our brokers are,

John Ehrhardt
Lansdowne Insurance Brokers
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BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY
VOLUME 21, PART 4, DECEMBER 2008

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September 2008 ISSN 0952-7583 Vol. 21, Part 3

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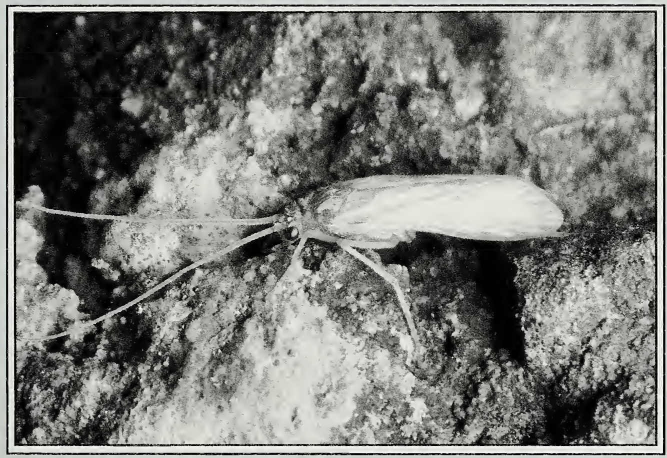

BRITISH ENTOMOLOGICAL & NATURAL HISTORY SOCIETY

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY
Published by the British Entomological and Natural History Society
and incorporating its Proceedings and Transactions

British Journal of Entomology and Natural History is published by the British Entomological and Natural History Society, Dinton Pastures Country Park, Davis Street, Hurst, Reading, Berkshire RG10 0TH, UK. Tel: 01189-321402. The Journal is distributed free to BENHS members.

Typeset by Tavistock Digital Data, Tavistock, Devon.
Printed in England by Henry Ling Ltd, Dorchester, Dorset.

BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY
Registered charity number: 213149

The Society arranges a programme of talks on Saturdays at various locations in Great Britain and a joint evening lecture with the LNHS in London in September. In addition, workshop meetings are held at the Society's headquarters and the well-known ANNUAL EXHIBITION takes place in the autumn. The 2008 Exhibition is planned for Saturday 8 November at Imperial College, London SW7. Frequent Field Meetings are held at weekends in the summer. Visitors are welcome at all meetings. The current Programme Card can be obtained on application to the Secretary, J. Muggleton, at the address given below.

The Society maintains a library and invertebrate collections at its headquarters in Dinton Pastures, which are open to members on various advertised days each month. The Society's web site, http://www.benhs.org.uk, has the latest news.

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Cover photograph: The skating caddis, Agripnia crassicornis McLachlan (Phrygaenidae) Malham Tarn, Yorkshire, 21.vii.2007 (Photo: Emma Ross)

NOTE: The Editor invites submission of photographs for black and white reproduction on the front covers of the journal. The subject matter is open, with an emphasis on aesthetic value rather than scientific novelty. Submissions can be in the form of colour or black and white prints or colour transparencies.

THE USE OF TULLGREN FUNNELS TO SAMPLE BEETLES IN DEAD WOOD

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Abstract

A method for extracting beetles from soft rotten wood by Tullgren funnel is described. Two hundred and thirty-six taxa including 80 saproxylic species were recorded from 189 samples of dead wood collected in a variety of lowland landscapes in England. The method is effective at detecting small, cryptic species associated with heartwood decay that are often overlooked by other sampling methods. The results support the status of *Microscydmus minimus* (Chaudoir) and *Plectophloeus nitidus* (Fairmaire) as Grade 1 indicators of ecological continuity with medieval pasture-woodland landscapes, but they conflict with a similar status for *Abraeus granulum* Erichson and *Aeletes atomarius* (Aubé). Lower grade indicators and other species identified as possible indicators that were frequently detected using Tullgren funnels, showed no affinity with ancient woodland except for *Ptenidium gressneri* Erichson.

Introduction

The Index of Ecological Continuity (IEC) is widely used to score the conservation quality of saproxylic beetle assemblages in Britain. It is based on species graded as indicators of ecological continuity (Alexander, 2004). Grade 1 indicators are defined as 'species which are known to have occurred in recent times only in areas believed to be ancient woodland, mainly pasture-woodland' (Harding & Rose, 1986). Grades 2 and 3 refer to species with progressively weaker associations with ancient woodland. Alexander (2004) also identified further species as possible additions to the list of indicators.

Beetles associated with the decay of heartwood are a group particularly rich in species with high conservation status and designated indicators of ecological continuity, so it is important to survey them adequately, when carrying out field assessments of saproxylic assemblages (Lott, 1995). Unfortunately, they can be difficult to survey. Quite apart from the inaccessibility of their habitat, some species have short adult life spans and are in many cases most frequently detected by rearing their larvae. Other species are small, slow-moving and cryptically coloured, so that they are difficult to spot in the field using the normal collecting techniques. Early in my career, Colin Johnson advised me to try using Tullgren funnels when surveying the latter group of species. Tullgren funnels (also known as Berlese funnels) are primarily used for extracting animals from soil samples (Southwood & Henderson, 2000; Gange, 2005), but are also suitable for dealing with loose friable wood mould. This paper is a summary of the results of putting this advice into practice in the subsequent twenty years.

Methods

Between 1987 and 2006, samples of rotting wood were removed by hand from the interior of large trees, logs and stumps and taken home in self-seal polythene bags. All samples were damp to the touch and friable, or at least soft enough to cut away

with a sheath knife. Dry samples were found to be unproductive and their collection was soon discontinued. Sampling locations are given in Appendix 1. Approximately two thirds of the samples originated in the vice-county of Leicestershire and Rutland, the remainder being scattered throughout lowland England as far north as Sherwood Forest, Nottinghamshire and Hatchmere, Cheshire and as far west as Bredwardine, Herefordshire.

The samples were then placed in Tullgren funnels. At first these consisted of an anglepoise lamp fitted with a 40 Watt incandescent bulb shining onto a glass funnel with a 200 mm. diameter opening. The funnel was clamped to a laboratory stand and held over a 250 ml. conical flask half-filled with 50% ethanol. This arrangement was soon replaced by a wooden frame constructed to hold four funnels operating at the same time. The same heat source, funnel size and collecting fluid were used in both arrangements, so that all extracted samples are taken to be comparable. Material from the conical flasks was then sorted in a Petri dish under a binocular microscope and all beetles were identified to species wherever possible.

For each sample the following information was noted down wherever possible:

(i) ecological continuity of the landscape,
(ii) biotope (closed canopy or open canopy),
(iii) species of tree,
(iv) position of the sample in the tree.

Two types of landscape ecological continuity were used in the analysis. Sites with high continuity with ancient woodland were defined as those having continuous woodland cover since 1600. This class includes coppice woodland, pasture-woodland and woodland that was clear-felled in the Second World War, where natural regeneration took place immediately. A more restrictive class of sites with high continuity with medieval pasture-woodland were defined as areas of medieval forest or deer park that retain populations of ancient trees surviving from a period of active management as pasture-woodland as described by Rackham (1986) using the term wood-pasture.

Results

Species recorded

Two hundred and thirty-six species of Coleoptera including 80 saproxylic species as listed by Alexander (2002, 2004) and updated by Johnson (2008) were recorded from 189 samples taken from 78 localities in England (see Plate 5, Figs. 1–6). Some of the larger species recorded were actually removed while filling the funnels with material and were thus saved from an early bath. The saproxylic species recorded are listed in Appendix 2 together with notes on their recorded geographical distribution, seasonal occurrence and favoured tree species and microhabitats as appropriate. Also included in the list are some of the more interesting non-saproxylics and several species, whose pattern of occurrences suggest that they should be added to Alexander's list of saproxylic beetles.

As expected, small saproxylic species feature prominently in the list. Among the Histeridae *Abraeus perpusillus* (Plate 5, Fig. 1) (Marsham) was found in 34% of occupied samples, while two nationally scarce species, *Plegaderus dissectus* (Plate 5, Fig. 2) Erichson and *Abraeus granulum* Erichson were found in 18% and 7% of the samples, respectively. Ptiliidae were also well represented. The naturalized species, *Ptinella errabunda* Johnson, was found in 28% of samples and often occurred in

large numbers. 12% of samples contained *Ptenidium laevigatum* Erichson which has also been frequently found in underground mammal nests. The nationally scarce *Ptenidium gressneri* Erichson was found in ten samples. National Red Data book species that were recorded in several samples include *Microscydmus minimus* (Chaudoir) (Scydmaenidae) (7 samples) and *Plectophloeus nitidus* (Fairmaire) (Staphylinidae) (6 samples). The recording of the click beetle, *Melanotus villosus* (Fourcroy) in 29% of samples was facilitated by the distinctiveness of its larva (van Emden, 1945). *Abraeus granulum, Microscydmus minimus* and *Plectophloeus nitidus* are species that have not been taken by the author using any other collecting method.

Many saproxylic species were only taken in a small number of samples, but these included several rarely recorded species such as *Aeletes atomarius* (Aubé) (Histeridae), *Ptenidium turgidum* Thomson (Ptiliidae), *Euthia formicetorum* Reitter (Scydmaenidae), *Stenichnus godarti* (Plate 5, Fig. 3) (Latreille) (Scydmaenidae), *Euryusa sinuata* Erichson (Staphylinidae), *Euplectus nanus* (Reichenbach) (Staphylinidae) and *Batrisodes adnexus* (Hampe) (Staphylinidae).

Seasonal variations

Positive samples were obtained in every month of the year. On average more species per sample were recorded in winter months (see Fig. 1a). However this trend is much less evident when non-saproxylic species are excluded (see Fig. 1b) and the extra numbers recorded in winter are likely to be largely made up of species using dead wood for hibernation.

The influence of landscape ecological continuity

The mean number of saproxylic species in samples from various ancient woodland types was similar to those from the wider countryside, or even slightly lower (see Table 1). Nevertheless, a small number of individual species appeared to prefer ancient woodland sites (see Table 2).

The results for *Plectophloeus nitidus* (Staphylinidae) and *Microscydmus minimus* (Scydmaenidae) are not incompatible with their selection as Grade 1 indicators of continuity with medieval pasture-woodland landscapes. In each case all their occupied samples came from medieval deer parks or forests. However, the selection of the histerid *Abraeus granulum* as a Grade 1 indicator is not supported. It was actually found in a lower proportion of samples from medieval pasture-woodland remnants than would be expected by chance. Similarly, all three samples containing the Grade 1 indicator *Aeletes atomarius* (Histeridae) came from sites well removed

Table 1. Comparison of samples from landscapes with ecological continuity

		Samples in landscapes with continuity to:	
	All samples	Medieval pasture-woodland	All types of ancient woodland
No. samples	189	54	94
Mean no. saproxylic spp./sample	2.9	2.6	2.6

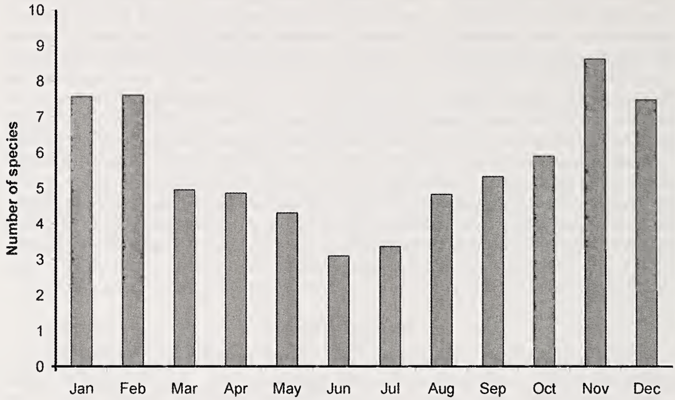

Figure 1a. Monthly variations in mean number of all species recorded per sample

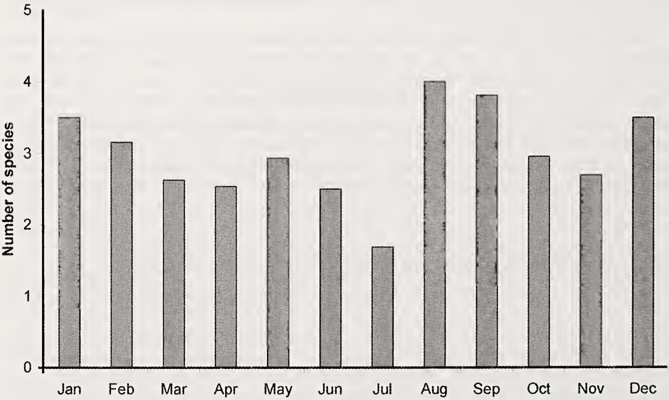

Figure 1b. Monthly variations in mean number of saproxylic species recorded per sample

from medieval pasture-woodland remnants and this species is also unlikely to prove to be a reliable indicator of ecological continuity.

The results reveal no other candidate indicator species, although it is interesting to note that *Ptenidium gressneri* (Ptiliidae) is a potential indicator of continuity with a wider class of ancient woodland. The other lower grade indicators and species identified as possible additional indicators show no special affinity for medieval pasture-woodland remnants.

Other environmental influences

Sixty-six saproxylic species were recorded from open parkland and farmland compared with 56 saproxylic species from closed canopy woodland even though the number of samples collected from open canopy biotopes was lower (85 samples compared with 104 samples). Several individual saproxylic species appeared to occupy a much larger proportion of samples from open canopy biotopes than would be expected by chance, but assessing the significance of these results is not straightforward due to covariance with other factors. A smaller number of species appear to favour closed canopy woodland.

On average, samples from beech, poplar and ash supported a higher number of saproxylic beetle species than willow, birch and oak (see Table 3). However, none of the frequently recorded beetles were restricted to a single tree species except that all six samples containing *Plectophloeus nitidus* (Staphylinidae) came from oak.

The position of the sample in the tree was found to have little influence on its productivity for saproxylic species. However, one species, *Euplectus bonvouloiri* (Staphylinidae) was only recorded from tree roots or low down inside stumps.

Discussion

Tullgren funnel extractions from samples of dead wood were found to be an effective method for detecting small cryptic species that are often overlooked by normal collecting methods. Several of these species have high conservation status or are quoted as indicators of ecological continuity. It is possible that some of these species are considered to be rare because they have been under-recorded. Further use of the technique described in this paper is likely to prove useful in clarifying the true status of these species. It has to be acknowledged that the collection of dead wood samples is essentially destructive of habitat and has the potential to have an impact on populations of species of conservation interest if carried out on a large scale. However, wood that is accessible for sampling is often found in wind-damaged or decrepit trees and is likely to be approaching the end of its useful period of exploitation by saproxylic beetles.

An obvious criticism of the sampling protocol followed here is that the volume of wood taken for extraction has not been standardized. In practice, it would be difficult to achieve this because the volume that is accessible for sampling varies widely from tree to tree. In any case, the degree to which the sample has been protected from the elements within the tree is just as likely to affect the catch as the volume of material taken.

Samples have been taken from a wide variety of environments including farmland and closed canopy woodland in addition to classic pasture-woodland sites that are celebrated for their saproxylic beetle fauna. This facilitates an assessment of the reliability of the designations by Alexander (2004) of those indicators of ecological

Table 2. Representation of saproxylic species in samples from landscapes with ecological continuity (Only species recorded from more than five samples are shown)

Species	Continuity grade (Alexander, 2004) (? = listed as possible addition)	No occupied samples	% occupied samples in landscapes with continuity to: Medieval pasture woodland (% expected by chance = 28)	Ancient woodland (% expected by chance = 50)
Plectophloeus nitidus (Fairm.)	1	6	100	100
Microscydmus minimus (Chaud.)	1	7	100	100
Cis fagi Waltl		7	43	57
Gabrius splendidulus (Grav.)		10	40	50
Euplectus infirmus Raffray		13	38	62
Plegaderus dissectus Erichson	2	34	38	56
Ptinella errabunda Johnson		52	35	63
Paromalus flavicornis (Herbst)	?	18	33	39
Euplectus bonvouloiri Reitter		6	33	67
Ptinella aptera (G.-M.)		13	31	31
Ptenidium gressneri Erichson	2	10	30	100
Atrecus affinis (Paykull)		18	28	61
Euplectus kirbii Denny		13	23	38
Cerylon histeroides (Fabr.)	?	9	22	22
Euophryum confine (Broun)		10	20	40
Abraeus perpusillus (Marsham)	?	65	18	29
Pteryx suturalis (Heer)		22	18	64
Melanotus villosus (Fourcroy)		55	17	36
Quedius microps Gravenhorst	3	7	14	57
Cerylon ferrugineum Stephens	?	7	14	29
Abraeus granulum Erichson	1	14	14	43
Sepedophilus testaceus (Fabr.)	?	8	13	13
Leptusa fumida (Erichson)		9	11	22
Scaphisoma boleti (Panzer)		8	0	13
Cis nitidus (Fabr.)		7	0	29
Denticollis linearis (L.)		6	0	33

Table 3. Variations in mean numbers of saproxylic beetle species from different tree species

Tree species	No. samples	Mean no. saproxylic spp.
Beech	21	4.8
Poplar	11	4.2
Ash	28	3.9
Willow	19	2.4
Birch	17	2.1
Oak	50	2.1

continuity that were well represented in the samples. The results suggest that two Grade 1 indicators of ecological continuity designated by Alexander really are associated with ancient woodland sites, while two others appear not to be. The lack of affinity for pasture-woodland remnants of recorded low grade and other potential indicators suggests that assemblages of these species in dead wood indicate current density of accessible high grade habitat rather than ecological continuity. The high quality of some of the assemblages recorded in the wider countryside highlights the potential importance of mature trees in a wider context than the pasture-woodland sites already recognised for their important saproxylic beetle fauna. The rarest beetle recorded in the samples was *Batrisodes adnexus* (Staphylinidae), which was recorded with several other notable species in a hedgerow ash in the Leicestershire countryside eight kilometres away from the nearest ancient woodland (Lott, 1997).

Lott (2007) reported a positive response among beetles associated with peripheral decay in dead branches to an opening up of the canopy at Sherwood Forest. The results of this survey suggest some support for a preference by several heartwood decay species for open canopy biotopes. Further investigation of this topic should produce some interesting results.

Acknowledgements

The author wishes to thank Colin Johnson for assistance with the identification of Ptiliidae, Cryptophagidae and Latridiidae and Jon Cooter for assistance with the identification of Leiodidae. I am grateful to Norman Bray for constructing the wooden frame for the bank of Tullgren funnels. Special thanks to Frank Köhler, Bornheim, Germany for allowing the use of photographs from his Coleoptera photographic library.

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Appendix 1. Sampling locations

			Ecological continuity with:		
County	Site/location	Hectad	Medieval pasture woodland	Ancient woodand	No. samples
Berks	Windsor Great Park	SU97	high	high	3
Ches	Hatchmere	SJ57	low	low	1
Essex	Waltham Abbey	TL30	low	low	9
Gloucs	Nutterswood	SO92	low	high	1
Hants	New Forest	SU20/21/30	high	high	3
Herefs	Bredwardine	SO34	high	high	1
Hunts	Monks Wood	TL18/27/28	low	high	4
Leics	Ashby de la Zouche	SK31	low	low	1
	Ashby Folville	SK71	low	low	2
	Barkby Holt	SK60/61	low	low	2
	Barrow Gravel Pits	SK51	low	low	3
	Beaumanor Park	SK51	high	high	2
	Birch Coppice	SK31	low	low	1
	Blaby Hall	SP59	low	low	2
	Blackbrook Reservoir	SK41	low	low	1
	Bosworth Park	SK40	low	low	2
	Bradgate Park	SK50	high	high	2
	Braunstone Park	SK50	low	low	3
	Buddon Wood	SK51	low	high	7
	Burley Wood	SK80/81	low	high	5
	Charnwood Lodge Nature Reserve	SK41	low	low	1
	Chater Valley SSSI	SK80	low	low	1
	Clipsham	SK91	low	low	1
	Cloud Wood	SK42	low	high	2
	Cotes	SK52	low	low	2
	Croxton Park	SK82	high	high	5
	Donington Park	SK42	high	high	13
	Empingham Marshy Meadows	SK90	low	low	1
	Fishpool Plantation, Old Dalby	SK62	low	low	1
	Fosse Meadows	SP49	low	low	2
	Glenfield	SK50	low	low	2
	Gopsall Park	SK30	low	low	2
	Grace Dieu Wood	SK41	low	high	3
	Hamilton	SK60	low	low	1
	Holwell Mouth	SK72	low	low	1
	Launde Big Wood	SK70	low	high	1
	Loddington	SK70	low	low	3
	Loddington Reddish	SK70	low	high	2
	Loughborough	SK52	low	low	1
	Melton War Memorial Hospital	SK71	low	low	1
	Merrys Meadows	SK91	low	low	1
	Misterton	SP58	low	low	4
	Mountsorrel	SK51	low	low	1
	Muston	SK83	low	low	1
	Narborough Bog	SP59	low	low	2
	Newbold	SK41	low	low	1
	Newell Wood	TF01	low	high	2
	Outwoods, Loughborough	SK51	low	high	1

APPENDIX 1. (Continued)

County	Site/location	Hectad	Ecological continuity with: Medieval pasture woodland	Ancient woodand	No. samples
Leics	Owston Wood	SK70	low	high	1
	Priors Coppice	SK80	low	high	3
	Quorn	SK51	low	low	2
	Rough Park	SK31	low	low	1
	Saddington Reservoir	SP69	low	low	1
	Saltby	SK82	low	low	1
	Saltersford Valley	SK31	low	low	1
	Shacklewell Hollow	SK90	low	low	1
	Sheet Hedges Wood	SK50	low	high	1
	Skeffington Wood	SK70	low	high	2
	Stanford Park	SP57	low	low	1
	Staunton Harold	SK32	low	low	3
	Swithland Wood	SK51	low	high	2
	Syston	SK61	low	low	1
	Terrace Hills	SK83	low	low	2
	Twycross	SK30	low	low	1
	Twyford	SK71	low	low	1
	Ulverscroft Nature Reserve	SK41	low	low	1
	Wymeswold Meadows	SK62	low	low	3
	Wymondham Rough	SK81	low	low	1
Lincs	Lawn Wood	SK91	low	high	1
	Tortoiseshell Wood	SK91/92	low	high	2
Middx	Crane Park, Twickenham	TQ17	low	low	1
Notts	Sherwood Forest	SK66	high	high	13
Salop	Attingham Park	SJ50/51	high	high	9
Staffs	Cannock Chase	SJ91	high	high	2
Surrey	Chobham Common	SU96	low	low	1
	Lyne	TQ06	low	low	1
Worcs	Croome Park	SO84	low	low	14
	Gullet Wood	SO73	high	high	1

APPENDIX 2. SAPROXYLIC SPECIES RECORDED IN 189 SAMPLES OF DEAD WOOD.

Nomenclature follows Duff (2008). Species that occur frequently in dead wood, but which are not listed as saproxylic by Alexander (2002) and Johnson (2008) are marked with +. Rare non-saproxylic species are marked with −.

Species	No. samples	Occurrence
Aderidae		
Aderus populneus (Creutzer)	1	Herefs: beech stump, Bredwardine, SO34, 15.ii.97.
Anobiidae		
Ptinus sexpunctatus Panzer−	1	Leics: beech trunk, Grace Dieu Wood, SK41, 15.v.99.

(Continued)

APPENDIX 2. (Continued)

Cerambycidae		
Leiopus nebulosus (L.)	1	Worcs: fallen oak branch, Croome Park, SO84, 16.v.96.
Rhagium bifasciatum Fabr.	1	Notts: oak trunk, Sherwood, SK66, 1.vi.98.
Cerylonidae		
Cerylon ferrugineum Stephens	7	Leics, Salop, Worcs: scattered through year.
Cerylon histeroides (Fabr.)	9	Leics, Salop, Worcs: scattered through year.
Ciidae		
Cis bidentatus (Olivier)	1	Leics: ash stump, Loddington, SK70, 4.v.96.
Cis bilamellatus Wood	4	Leics: Sep – May.
Cis fagi Waltl	7	Leics: SK42, SK52, SK80, SK82, Mar – Oct.
Cis nitidus (Fabr.)	7	Leics, Lincs, Worcs: scattered through year.
Sulcacis affinis (Gyllenhal)	1	Leics: Wymeswold Meadows, SK62, 1.i..00.
Corylophidae		
Orthoperus nigrescens Stephens	1	Leics: fallen trunk, Buddon Wood, SK51, 28.ix.95.
Cryptophagidae		
Cryptophagus dentatus (Herbst)	1	Leics: trunk, Launde Big Wood, SK70, 1.ix.98.
Cryptophagus pallidus Sturm	1	Worcs: May.
Curculionidae		
Cossonus parallelepipedus (Herbst)	1	Essex: poplar trunk, Waltham Abbey, TL30, 5.iii.93.
Euophryum confine (Broun)	10	widespread and scattered through year.
Phloeophagus lignarius (Marsham)	1	Leics: poplar stump, Burley Wood, SK80, 6.v.90.
Elateridae		
Denticollis linearis (L.) (larvae)	6	widespread: Nov – May.
Melanotus villosus (Fourcroy) (larvae)	55	widespread and scattered through year.
Endomychidae		
Holoparamecus caularum (Aubé) –	1	Worcs: oak trunk, Croome Park, SO84, 12.ix.06.
Mycetaea subterranea (Fabr.)	5	Essex, Leics & Worcs: Sep – Mar.
Erotylidae		
Dacne bipustulata (Thunberg)	1	Salop: lime trunk, Attingham Park, SJ50, 15.x.91.
Dacne rufifrons (Fabr.)	1	Leics: stump, Wymeswold Meadows, SK62, 15.i.95.
Histeridae		
Abraeus granulum Erichson	14	Herefs, Leics, Lincs & Salop: scattered through year.
Abraeus perpusillus (Marsham)	65	widespread throughout year, possibly prefers open canopies.
Aeletes atomarius (Aubé)	3	Leics: ash & beech trunks, SK50, SK71, SK83, Mar & Sep.
Paromalus flavicornis (Herbst)	18	widespread: Feb – Jun, Sep, Oct, possibly prefers open canopy
Plegaderus dissectus Erichson	34	widespread and scattered through year.
Latridiidae		
Corticaria alleni Johnson	1	Leics: fallen oak trunk, Croxton Park, SK82, 17.ix.94.
Dienerella clathrata (Mannerheim)	2	Berks & Worcs: May & Oct.
Enicmus testaceus (Stephens)	1	Ches: birch stump, Hatchmere, SJ57, 21.ii.92.
Enicmus transversus (Olivier) +	14	widespread and scattered through year.
Lithostygnus serripennis Broun -	1	Leics: oak roots, Donington Park, SK42, 30.x.91.

(Continued)

APPENDIX 2. (Continued)

Species	No. samples	Occurrence
Leiodidae		
Agathidium seminulum (L.)	1	Leics: lime stump, Swithland Wood, SK51, 15.ix.90.
Nemadus colonoides (Kraatz)	3	Essex & Leics: alder & willow stumps, SK51, TL30, Mar & Apr.
Lucanidae		
Dorcus parallelipipedus (L.)	3	Leics & Worcs: May – Jul.
Sinodendron cylindricum (L.)	1	Leics: willow trunk, Loughborough, SK52, 18.ix.90.
Monotomidae		
Rhizophagus dispar (Paykull)	4	Leics: Jun – Sep.
Mycetophagidae		
Mycetophagus quadripustulatus (L.)	2	Leics & Salop: Oct.
Ptiliidae		
Nossidium pilosellum (Marsham)	3	Hunts & Leics: Feb – Apr.
Oligella intermedia Besuchet -	1	Leics: willow trunk, Fosse Meadows, SP49, 4.vii.96.
Ptenidium gressneri Erichson	10	Herefs, Hunts, Leics & Worcs: Feb – Jun.
Ptenidium laevigatum Erichson +	23	widespread and scattered through year.
Ptenidium pusillum (Gyllenhal) +	13	widespread and scattered through year.
Ptenidium turgidum Thomson	2	Hants & Herefs: in beech, Bredwardine & New Forest, SO34, SU30, Feb & Sep.
Pteryx suturalis (Heer)	22	Leics, Notts & Salop: scattered through year, possibly prefers closed canopy.
Ptinella aptera (Guérin-Méneville)	13	widespread: Aug – Apr.
Ptinella errabunda Johnson	52	widespread and scattered through year.
Scydmaenidae		
Eutheia formicetorum Reitter	2	Worcs: fallen beech trunk, Croome Park, SO84, 30.v & 26.vi.96.
Microscydmus minimus (Chaudoir)	7	Leics & Notts: birch & oak, Donington Park & Sherwood, SK42, SK66, Jun, Aug & Oct.
Microscydmus nanus (Schaum)	3	Leics & Notts: birch & oak, Buddon Wood & Sherwood, SK51, SK66, Apr – Jun.
Neuraphes plicicollis Reitter	1	Notts: birch trunk, Sherwood, SK66, 12.viii.98.
Stenichnus godarti (Latreille)	3	Berks & Worcs: in beech, Croome Park & Windsor, SO 84, SU97, May, Jun & Oct.
Sphindidae		
Aspidiphorus orbiculatus (Gyllenhal)	2	Leics: SP58, SP59, Mar & Nov.
Staphylinidae		
Acrulia inflata (Gyllenhal)	1	Leics: birch stump, Burley Wood, SK80, 25.ix.90.
Aleochara discipennis Mulsant & Rey –	1	Leics: oak root, Donington Park, SK42, 30.x.91.
Atrecus affinis (Paykull)	18	widespread and scattered through year.
Batrisodes adnexus (Hampe)	2	Leics: ash trunk, Ashby Folville, SK71, 22.ii & 31.iii.97.
Batrisodes venustus (Reichenbach)	2	Leics & Notts: in oak & willow, Shacklewell Hollow & Sherwood, SK66, SK90, 26.ix.90 & 3.vi.06.
Bibloporus bicolor (Denny)	4	Leics & Staffs: May, Jul & Dec.

(Continued)

APPENDIX 2. (Continued)

Species	No. samples	Occurrence
Staphylinidae (Continued)		
Bibloporus minutus Raffray	1	Worcs: fallen beech trunk, Croome Park, SO84, 30.vi.96.
Bolitochara bella Märkel	1	Leics: willow trunk, Narborough Bog, SP59, 9.xi.96.
Bolitochara lucida (Gravenhorst)	4	Essex, Leics & Worcs: Feb – Sep.
Coryphium angusticolle Stephens	1	Leics: fallen oak trunk, Misterton, SP58, 17.iii.99.
Dexiogyia corticina (Erichson)	2	Leics: SK83, SP58, Mar & Sep.
Dropephylla ioptera (Stephens)	5	Essex, Leics & Worcs: Mar – May.
Euplectus bonvouloiri Reitter	6	Berks, Hunts & Leics: in roots and stumps, Mar – May, Sep, Oct.
Euplectus infirmus Raffray	13	widespread: Apr – Jun, Sep, Oct.
Euplectus karstenii (Reichenbach) +	10	widespread: Mar – Jul, Oct, Nov.
Euplectus kirbii Denny	13	widespread: Mar – May, Sep, Oct.
Euplectus nanus (Reichenbach)	1	Notts: birch stump, Sherwood, SK66, 12.viii.98.
Euplectus piceus Motschulsky	5	Hants, Leics & Notts: May, Jun, Sep – Dec.
Euryusa sinuata Erichson	1	Worcs: oak trunk, Croome Park, SO84, 30.v.96.
Gabrius splendidulus (Gravenhorst)	10	widespread and scattered through year.
Gyrophaena manca Erichson	1	Leics: Mar.
Hapalaraea pygmaea (Paykull)	1	Worcs: beech trunk, Croome Park, SO84, 12.ix.06.
Haploglossa gentilis (Märkel)	1	Leics: willow trunk, Syston, SK61, 4.iii.95.
Haploglossa villosula (Stephens) +	4	Leics & Salop: Oct, Mar & Apr.
Hypnogyra angularis Ganglbauer	4	Leics, Middx & Worcs: in trunks, SK91, SO84, TQ17, Apr, Jun & Oct.
Leptusa fumida (Erichson)	10	Leics: scattered through year.
Microdota inquinula (Gravenhorst) –	1	Worcs: Oct.
Oxypoda recondita Kraatz	4	Leics & Notts: in beech & oak, SK32, SK41, SK50, SK66, Apr, Jun, Aug, Nov.
Plectophloeus nitidus (Fairmaire)	6	Berks, Leics & Notts: in oak, Bradgate Park, Donington Park, Sherwood and Windsor, SK42, SK50, SK66, SU97, possibly prefers open canopy.
Quedius microps Gravenhorst	6	Essex, Gloucs, Leics & Worcs: SK80, SK82, SO73, SO92, SP59, TL30, Feb–May, Nov, possibly prefers closed canopy.
Quedius scitus (Gravenhorst)	3	Leics: SK42, SK71, SK90, Mar, Sep & Oct.
Quedius xanthopus (Erichson)	1	Notts: birch trunk, Sherwood, SK66, 29.iv.98.
Scaphisoma agaricinum (L.)	3	Leics & Worcs: SK70, SO84, SP59, May & Jul..
Scaphisoma boleti (Panzer)	8	Essex & Leics: Jan – Mar, Jul, Sep.
Sepedophilus lusitanicus Hammond	2	Essex & Worcs: Mar & Jun.
Sepedophilus marshami (Stephens) +	8	Essex, Leics & Worcs: Mar – Jul, Nov.
Sepedophilus testaceus (Fabr.)	7	Essex, Hants & Leics: Sep – Mar.
Tenebrionidae		
Eledona agricola (Herbst)	1	Hants: oak trunk, Mark Ash Wood, SU20, 17.ix.99.

GREENOMYIA BRUNETTI, 1912 (DIPTERA, MYCETOPHILIDAE), A GENUS NEW TO THE BRITISH LIST

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Abstract

Greenomyia mongolica Laštovka & Matile, 1974 is recorded for the first time in the British Isles, from three sites in southern England. It has been recorded widely in Europe in recent years and is considered likely to be a recent introduction to Britain. Its occurrence in Switzerland, Italy and Croatia is also newly confirmed.

Introduction

It was reported (Chandler, 2007) that Graham Collins had found a female of the genus *Greenomyia* Brunetti in his house. It was then concluded that it was likely to be an exotic introduction rather than one of the species already known from Europe, but specific identification was considered impracticable pending discovery of males.

However, during 2007 Judy Webb and Del Smith referred to me some males of this genus that had been collected in England. In these instances the specimens were found by trapping in outdoor situations and I now consider it probable that the female collected earlier was conspecific with them. Examination of the genitalia of these males suggested that they belonged to *G. mongolica* Laštovka & Matile, 1974 which appears to be the most widespread species in Europe.

In the Fauna Europaea database (Chandler, 2005) *G. mongolica* was omitted, all records of it from Europe being queried as possibly relating to *G. theresae* Matile, 2002. This was on the assumption that only one species of the genus with black coxae was present in Europe, which may be the case if *G. theresae* is not a distinct species from *G. mongolica*, but that requires clarification.

The British records

Greenomyia mongolica is reported as new to the British list on the basis of the following records:

ESSEX: near Great Dunmow, Cammas Hall (TL56581533), garden, Malaise trap sited by water-filled moat, x–xi.2007, 2 males, leg. C. W. Plant, initially det. D. A. Smith.

OXFORDSHIRE: Clay's Orchard (SU599944), Warborough, 27.x–14.xi.2007, 1 male, leg. J. Webb.

SURREY: Croydon (TQ333636), on kitchen window, 28.x.2006, 1 female, leg. G. A. Collins.

The Surrey specimen was collected on a dining room window and its means of entry to the house are unknown, but a door from this room leads to the garden and is only opened – at least in October – to bring in and put out a moth trap. The gnat was found on the window after examining the previous night's catch of moths although it could not be said that it had come directly from the trap. The garden of this house contains some apple (*Malus*) trees; there are cherry and plum trees (*Prunus* species) in neighbouring gardens and also some old woodland, with much dead wood, as close as 200 m from the garden.

The Oxfordshire site is an orchard with many old and decayed apple (*Malus*) and pear (*Pyrus*) trees. The specimen was collected using a Vane flight interception trap, which was suspended in an old fruit tree.

The Essex site, situated in the open country between Bishop's Stortford and Great Dunmow, is a private garden around Cammas Hall and is itself surrounded by arable land, with only small woodland areas nearby and a hedge of some age in the nearby lane. The garden is bounded on three sides by an ancient moat, with a good emergent and submerged flora. The white Malaise trap, in which the specimens were collected, was set on the sloping bank of the moat at the east side of the garden. The bank is dominated by grass and short ruderal herbs, but is mown short by the gardener. There is a bamboo plantation on the opposite bank. Although the garden is formal there are many trees, including elderly natives such as ash (*Fraxinus*), beech (*Fagus*) and nearest the trap position a mature oak (*Quercus*) but also many fruit trees, mostly plums (*Prunus*). A well-established compost heap was nearby.

The proximity of rosaceous fruit trees is the only obvious common factor between the three sites, but the requirement for wood affected by fungal decay (Zaitzev, 1982; see below) may be more important as records of the species elsewhere are mainly associated with ancient forest habitats.

Identification

Greenomyia mongolica is distinctive among British fungus gnats. It is mainly black bodied apart from narrow yellow apical markings more or less developed on the abdominal tergites and sternites of the male. The antennae and palpi are black. The legs are by contrast mainly yellow, with only the mid and hind coxae entirely black. The tibiae bear dorsal, anterior and ventral series of strong dark bristles, more than twice tibial width in length. The wings (length in material examined 3.7–3.9 mm in male and 3.8–4.3 mm in female) are clear apart from a broad dark brown apical shade (Fig. 1). The male genitalia (Fig. 2) are black and the structure of the gonostylus (Fig. 2b–c) is characteristic of the genus, with an apically rounded bristly outer lobe bearing two combs of strong blunt spines on the internal face.

Greenomyia Brunetti belongs to the subfamily Leiinae, which had tribal status in the handbook to the British species by Hutson, Ackland & Kidd (1980), who discussed *Greenomyia* and two other Palaearctic genera, not then known from Britain, in their introductory account of the group. They noted that this genus is similar to *Leia* Meigen, to which it runs in their key on venational characters, i.e. Sc ending in costa and R_1 shorter than r–m. It differs from *Leia* in that the lateral ocelli are remote (separated by more than twice their diameter) from the eye margins and the median and posterior forks of the wing are complete and not interrupted basally. They added that the entire wing tip is usually dark, a character which differs from any species of *Leia* found in Britain and applies to *G. mongolica* but not to all species of *Greenomyia*.

Until recently three species of *Greenomyia* (*G. mongolica*, *G. borealis* (Winnertz, 1863) and *G. theresae* Matile, 2002) had been recorded from Europe and a fourth *G. lucida* (Becker, 1908) from the Canary Islands. Two further species, *G. stackelbergi* Zaitzev, 1982 and *G. baikalica* Zaitzev, 1994, described respectively from the far east of Russia and from Siberia, have now been recorded from Sweden by Kjaerandsen *et al.* (2007). Zaitzev (1994) keyed the four species known from Russia, including *G. mongolica*, *G. borealis* and the two latter; he separated *G. mongolica* by the coloration of its coxae, the mid and hind coxae being entirely black while at most the hind coxa is dark basally in the other species. These other species mostly resemble

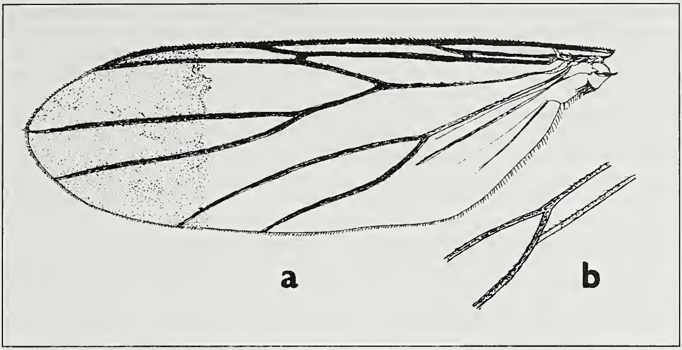

Fig. 1. *Greenomyia mongolica* Laštovka & Matile, wing: (a) dorsal view of male wing; (b) part of wing showing fusion of anal vein with posterior fork in an Essex male.

G. mongolica in being mainly black bodied with a dark wing tip, the exception being *G. stackelbergi* which has unmarked wings and a mainly yellow mesonotum.

Matile (2002) described *G. theresae*, a second European species with the mid and hind coxae black, from two males and one female collected at Aosta in the Italian Alps. He figured the male genitalia together with those of *G. mongolica* (based on the

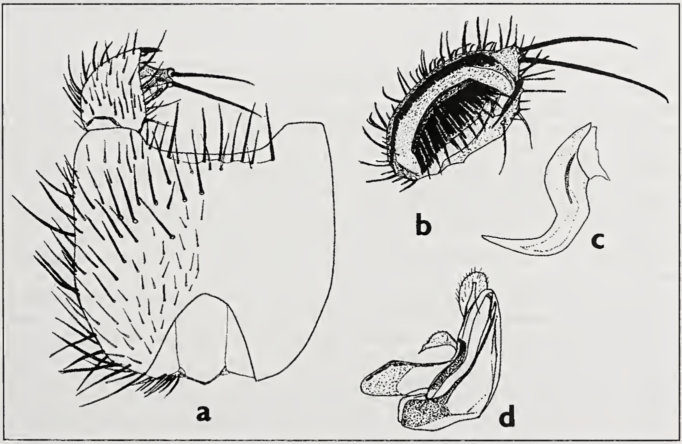

Fig. 2. *Greenomyia mongolica* Laštovka & Matile, male genitalia: (a) ventral view of gonocoxites and left gonostylus; (b-c) internal view of right gonostylus with (b) outer and (c) inner lobes separated; (d) aedeagus, right lateral view.

Mongolian holotype) for comparison, indicating small differences in the bristling of the outer lobe of the gonostylus and a more basal bend in the slender unbristled inner lobe. Some specimens from elsewhere in Italy (Apennines), Switzerland and Croatia, which had been examined by the present author, were mentioned by Matile and assigned to *G. theresae* under 'other material'. Re-examination of these specimens has indicated that they, like the males recorded here from Britain, more closely resemble Matile's figures of *G. mongolica* in these characters. All of the males examined are considered indistinguishable from other European specimens that have been identified as *G. mongolica*. It has not been practicable to examine the type material of *G. theresae*, but it should be noted that Matile's paper was published posthumously nearly two years after his death and that he would have been unaware of most of the other European records of *G. mongolica* when it was written.

Matile (2002) provided a key to the males of eleven species of *Greenomyia* worldwide. Apart from the gonostylar structure he separated *G. theresae* from *G. mongolica* only by the coloration of the abdomen, the sternites in the former having wide yellow apical bands while in the latter the bands on the sternites were as narrow as those on the tergites. He did note that the paratype female from Italy and a female from Croatia had the abdomen entirely dark, thus resembling the British female, a point overlooked when that was first recorded.

Zaitzev (1982) figured the ovipositor of *G. mongolica*. Kurina (1997) recorded *G. mongolica* based on two females from Estonia and provided figures of the wing and ovipositor. Kurina noted, as shown in his figure, that the anal vein A_1 ended in CuA_2, the posterior branch of the posterior fork, shortly beyond its base. This is also the case in one of the British males from Essex (Fig. 1b) and almost so in the Croatian female but not in the other specimens examined, where this vein clearly stops short of contact with CuA_2, as shown in Fig. 1a.

Biology and distribution

The larval biology of *Greenomyia* is little known but was recorded for *G. mongolica* and for *G. borealis* by Zaitzev (1982). He recorded larvae of *G. mongolica* on the surface of decayed wood. He also described and figured the larva of *G. borealis*, which had been found on rotten birch (*Betula*) wood and was considered to be sapromycetophagous. Like many other fungus gnats the larva formed a web on the surface of the substrate but in this case the pupa lacked a cocoon. Zaitzev (1994) also referred to *G. baikalica* as having similar larval habits.

Ševčík & Martinovský (1999) recorded ten males of *G. mongolica* at flowers of ivy *Hedera helix* on 8.x.1991 in the Czech Republic. Matile (2002) noted that the type specimens of *G. theresae* were running about on ash (*Fraxinus*) leaves in an agitated manner.

Kurina (1997), when recording *G. mongolica* from Estonia, summarised previous records of the species and provided a distribution map, which showed a band stretching across from there to the far east of Russia. Since its description from Mongolia it had been recorded by Zaitzev (1982) from several localities in the Far East of Russia and from Kazakhstan, and by Zaitzev (1994) from the Moscow district. Kurina (*op. cit.*) concluded that it had a Balto-Eurasian distribution type and was absent from central Europe. This was also suggested as the distribution of the species when it was recently recorded from Sweden (Kjaerandsen *et al.*, 2007).

However, in addition to the records cited by the above authors *G. mongolica* has also been recorded from Bulgaria (Bechev 1989, 2000 and 2002), Austria (Niederösterreich) (Plassmann, 1996), the Czech Republic and Slovakia (Ševčík &

Martinovský, 1999), Hungary (Papp, 2000) and Germany (two sites in Bavaria) (Plassmann & Schacht, 2002). The following material from Croatia (1987), Italy (1992) and Switzerland (1997), previously referred to *G. theresae* (Matile, 2002), is here re-assigned to *G. mongolica*:

SWITZERLAND: AG, Würenlingen, 20.vii.1997, 1 male, 1 female, leg. G. Bächli (to be deposited in Entomologische Sammlung ETH Zentrum, Zürich, Switzerland);
ITALY: Umbria, civ. Ranieri, near Umbertino, 1–13.vii.1992, 1 male, leg. D.M. Ackland (in author's collection);
CROATIA: Plitvice Lakes, 23.ix.1987, 1 male, 1 female, leg. A.E. Stubbs (in author's collection).

It can therefore be concluded that *G. mongolica* is now widespread in Europe, although it may be a recent arrival to the west of Russia.

British records of *G. mongolica* are autumnal but records from other parts of Europe span the summer months, with the earliest being in May-June in Bulgaria where it was recorded from xerothermic oakwoods (Bechev, 2000). Records from central Europe (Ševčík & Martinovský, 1999; Plassmann & Schacht, 2002) and Sweden (Kjaerandsen *et al.*, 2007) are from July-October, the above records given under *G. theresae* by Matile (2002) falling within that flight period.

Acknowledgements

The author is grateful to Graham Collins, Del Smith and Judy Webb for referring specimens of *Greenomyia* to him for identification, and also to Colin Plant and the landowner Tricia Simcock for permitting information on the find at Cammas Hall to be published here. Olavi Kurina kindly provided me with a translation of the key to the genus by Zaitzev (1994).

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Heavy infestation of Rosemary beetle *Chrysolina americana* (L.) (Coleoptera: Chrysomelidae) in west Kent, 2006–2007. – This pretty beetle reached plague proportions in the Sidcup and Footscray areas of Kent during 2006–2007. Our entire estate of c. 4 km^2 was invaded by this beetle which migrates very readily in humid, mild and windy weather conditions, peaking in April to June. I recorded a total of 170 adults on four lavender bushes in the garden during 2006. From March to September 2007, I recorded 226 adult *C. americana* and 281 larvae from the same bushes (Table 1).

Table 1 Numbers of *C. americana* in a Sidcup garden, 2007

2007	No. adults	No. of larvae
March	6	2
April	10	241
May	144	28
June	56	10
July	6	0
August	3	0
September	1	0
Total	226	281

The species also attacked rosemary plants in high numbers, stripping the foliage almost bare. The beetle removed many of the flowerbuds from rosemary and especially from lavender bushes. I also observed the beetle feeding on the blue flower petals of our neighbour's sage (*Salvia officinalis*) plants. All of these bushes are normally attractive to bees and butterflies, but markedly less so once damage has been incurred. One wonders what effect this will have long term. At present the beetle seems to be increasing in numbers with no sign of any natural predators or parasitoids to keep it in check. The gardening press is still encouraging us and municipal authorities to plant arid-zone, drought-resistant species such as lavenders, thymes, rosemary and sages without pondering how susceptible they are to insect attack, and so we could yet see a further increase in rosemary beetle numbers in the immediate future. – STEVEN BULLER, 80 Riverside Road, Sidcup, Kent DA14 4PU.

THE BARKLICE (PSOCOPTERA) ASSOCIATED WITH AN OLD-FIELD SUCCESSION IN SOUTHERN BRITAIN

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ABSTRACT

Data on the barklice collected from experimental old-field succession plots at Silwood Park, Berkshire are presented. The population density of barklice increased with successional age and the development of tussocks. Two of the five species encountered were field-layer specialists, and one of these, *Kolbia quisquiliarum* Bertkau, dominated the assemblage. This species is shown to be bivoltine in southern Britain.

INTRODUCTION

The barklice or barkflies (Psocoptera) are a relatively small group that feed on algae, lichens, fungal hyphae, spores and fragments of plant or insect (New, 2005). As the names imply, they are almost exclusively found on trees and shrubs, living on the bark, foliage or leaf-litter. A few species are associated with more open habitats.

Changes in the insect fauna through secondary plant succession in temperate regions have been discussed by Southwood, Brown & Reader (1979) and Hendrix, Brown & Dingle (1988). More specific studies have been made of old-field succession habitats in groups such as the phytophagous beetles (Brown & Hyman, 1986) and leafhoppers (Hollier, Brown & Edwards-Jones, 1994), but the barklice have been largely ignored by ecologists.

METHODS

The data presented come from a long-term study of secondary vegetational succession carried out at Silwood Park, Berkshire. In successive years, starting in 1977, areas of a fenced experimental field at Silwood Bottom (SU944688) were taken out of arable cultivation, ploughed, harrowed and abandoned to old-field succession. The sites were $35\,m \times 25\,m$ and subdivided into $3\,m^2$ sampling plots, only data from control plots are presented. The sites were all at one end of the experimental field, which was surrounded by rabbit-grazed grassland. The experimental area is on Berkshire Sand, and the succession sites develop as relatively species-poor acid grasslands eventually becoming oak woodland. Closed oak canopies were present within 50m of all sites.

In 1987, six sites aged between one and eleven years were sampled (four dates, five or ten sample plots per site), while two other sites were sampled in both 1988 and 1989 (five dates, eight sample plots per site). Because the number of plots sampled varied, the density of psocids per square metre was calculated for site comparisons.

Vegetation data were recorded using point quadrat pins marked at 5 cm intervals, a method providing information about vegetation structure as well as species composition. The insects were sampled using a D-Vac suction apparatus with a 30 cm diameter head, the sample comprising three 30-second sucks in each plot. The catch was stored in 70% alcohol and sorted to Order. The adult barklice were identified using the keys of Lienhard (1998), but the nomenclature follows New (2005).

RESULTS

A total of 241 barklice were captured, most of them juveniles. The oldest sites had the greatest population density (Fig. 1). There was considerable between-year variation for the sites sampled in two years, presumably because of differences in the timing of the sampling or differences in the weather. On the oldest sites the density was relatively uniform across sampled plots, but some of the intermediate-aged sites were much less equitable, with all of the individuals being recorded from two or three plots.

Of the 54 adults, only 49 could be identified to species, the others being too damaged by their passage through the collection process. Three of the others were identified to genus; two *Valenzuela* spp. and one *Lachesilla* sp. The rest belonged to just five species:

Kolbia quisquiliarum Bertkau (Amphipsocidae) was the most abundant species, accounting for some two-thirds of the adults captured. It was most abundant on older sites, and many of the juveniles were of this species. All of the males were macropterous, and all of the females micropterous (see New, 2005: p.91). One of the few barklouse species to primarily inhabit the herb layer, *K. quisquiliarum* is typically found in tussocky vegetation (Lienhard, 1998). The distribution at Silwood conforms to this; the sites on which this species was abundant being characterised by tussocks, principally of *Dactylis glomerata* (cock's-foot). As Figure 2 shows, the captures, although relatively few in number, indicate that *K. quisquiliarum* is bivoltine in southern Britain, as it is on the continent (Lienhard, 1998). The species was regarded as rare in Britain, but recent observations suggest that it has been under-recorded (Saville *et al.,* 2005, Saville *et al.,* 2007), and can be very abundant in grassland

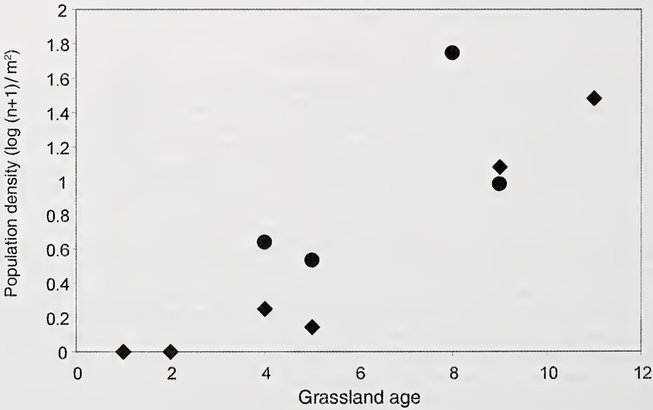

Fig. 1. Population density of barklice (log(n + 1) number per square metre) on 10 grasslands of different age (years since cultivation) at Silwood Park, southern England; sites sampled in 1987 represented by diamonds, sites sampled in 1988 and 1989 represented by circles.

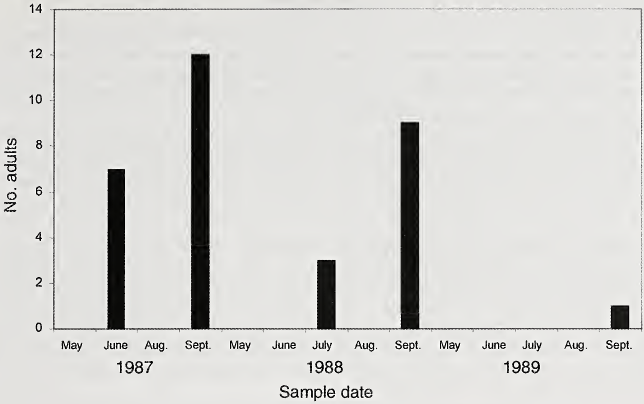

Fig. 2. The phenology of *Kolbia quisquiliarum*: total number of individuals captured on each of the 14 sampling dates between May 1987 and September 1989 at Silwood Park in southern England.

(Plant, 1979). It is interesting that New (1969) did not encounter this species in his study of the barklice living in leaf-litter at Silwood Park even though it had been reported from the estate (New, 1968), suggesting that *K. quisquiliarum* is a true grassland species, rather than simply a species inhabiting the field layer in many habitats.

Bertkauia lucifuga (Rambur) (Epipsocidae) was the second most abundant species, and is also a species normally found at ground level. Specimens were taken from two of the oldest sites. However, it is normally associated with woodland biotopes with leaf-litter or rotting wood (Lienhard, 1998), and not usually found in grasslands. The species is regarded as scarce in Britain (Saville, 2008), but was very common in litter at Silwood Park according to New (1968, 1969).

Ectopsocus petersi Smithers (Ectopsocidae) was present on five sites, though generally as singletons. This species lives on the leaves of a wide range of trees and shrubs, and is not infrequently found in the herb layer (Lienhard, 1998). It is common in Britain.

Ectopsocus briggsi McLachlan (Ectopsocidae) was present as a single individual on one of the older sites. This species has a similarly wide range of hosts to *E. petersi*, but is not normally found in the field layer (Lienhard, 1998). The regular presence of *E. briggsi* in leaf-litter samples at Silwood Park was reported by New (1968), but at that time *E. petersi* had not yet been described, and the material may well have been of that species. *Ectopsocus briggsi* is common in Britain.

Peripsocus subfasciatus (Rambur) (Peripsocidae) occurred as a singleton on the oldest site. A bark-dwelling species (Lienhard, 1998), it can be assumed to be a vagrant in grassland. The species is considered common in Britain.

Discussion

The barklice of the grasslands sampled showed a successional trend, both in terms of overall population density and the distribution of the most abundant species. The trend most obviously associated with this increase is vegetation structure, which becomes more complex during succession and the increase in litter associated with this (see Southwood, Brown & Reader, 1979).

Two species inhabiting the field layer dominated the assemblage, both being most abundant on the same two sites, and apparently associated with tussocky vegetation. These sites have been shown to support other insect species dependent on this kind of vegetation structure (Hollier, 2006). The species more casually associated with the herb layer showed no such habitat preference, being found on sites of most ages.

Since the females of *Kolbia quisquiliarum* and *Bertkauia lucifuga* are micropterous, what makes the findings interesting is the young age of the grasslands in question. Clearly, the chances of long-distance dispersal are very low, and previous records of *K. quisquiliarum* tend to be associated with ancient, calcareous grassland (Saville *et al.*, 2005). In the present study, the youngest site colonised by *K. quisquiliarum* was only four years old, while one of the 9-year-old sites and the 11-year-old site supported considerable populations. Similarly, *B. lucifuga* had colonised this 9-year-old site as well as the 11-year-old one.

The dispersal factor suggests that these old-field sites must have been colonised from existing populations of the two species relatively close to the experimental area. At first sight this is complicated by the fact that the two species typically inhabit different biotopes, but Silwood Park is part of the Windsor Great Park and Windsor Forest system of parkland and pasture woodland, which has supported both open and wooded habitats in a historically stable landscape. Although the results may therefore represent something of a special case, it is clear that colonisation is more rapid than might have been expected *a priori,* and that the barklice can be a significant component of grassland ecosystems.

Acknowledgements

The project from which these data come was carried out under the supervision of Val Brown and Sara Churchfield. Special thanks are due to Charles Lienhard for confirming or correcting the identifications and commenting on the manuscript.

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Spread of *Ophelimus ?maskelli* Ashmead (Hymenoptera: Eulophidae) in south-east England. – The occurrence of a gall-inducing eulophid wasp new to the UK and as yet not fully identified was reported by Tilbury & Jukes (2006). The first specimens of damaged foliage were reported from a garden in Lambeth, London in April 2005. I noticed a specimen tree of *Eucalyptus gunnii* heavily infested by this species at Gunnersbury Cemetery, west London on 3 April 2007 (det. Andrew Halstead). Most of the lower leaves were infested and each supported c. 80–120 galls of varying sizes (see Fig. 1).

Fig. 1. Eucalyptus leaf with *Ophelimus* galls.

At present it is not known how many of these galls reach maturity, but if only half are successful this represents a very heavy infestation of this new species. A quick search of *Eucalyptus* collections at Lullingstone Castle and Selling, Kent in July 2007 failed to show any evidence of this species. However a moderate infestation of the eulophid was discovered on a long-leaved eucalypt at Hyde Hall Gardens in Essex, a similar distance east from London on 1 June 2008 indicating that the gall wasp is spreading as predicted. – JOHN BADMIN, Coppice Place, Selling, Kent ME13 9RP.

REFERENCE

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BOOK REVIEW

Behavioral Ecology of Insect Parasitoids: from theoretical approaches to field application. (Eds) Wajnberg, É., Bernstein, C. & van Alphen, J. Blackwell Publishing, 2008. xvi + 445 pp. Hardback, ISBN 9781405163477. £45.00.

Most insect parasitoids are parasitic wasps, and this book is essentially about investigating and understanding the behaviour of parasitic wasps in an evolutionary context. As well as being highly speciose and constituting an immensely important component of practically all terrestrial ecosystems, parasitic wasps have been of special relevance to the development of theoretical and behavioural ecology, because of their numerically simple (for most, one offspring per parasitized and thereby killed host) yet behaviourally highly complex and specialised host relationships. Their haplo-diploidy offers further riches for research in this field, as mothers can choose the sex of their offspring. Thus the responses of parasitic wasps to varying conditions can be measured and their decisions modelled, and the extent to which their behaviour has been optimised by natural selection for lifetime reproductive success ("inclusive fitness") can be tested, in a more direct way than is the case for most organisms.

Each of the book's 18 chapters is written by a pair of authors, mostly well-known names with long experience and acknowledged expertise (some have co-authored more than one chapter), and between them they analyse pretty well all aspects of this rather wide, complex and challenging field – including optimal foraging, fitness, chemical ecology, nutritional physiology, competition, tritrophic interactions and, in a final section, issues concerning the rigorous methodology needed for behavioural research. One practical aim of such work on parasitoids is to be able to apply predictive models to field and/or mass culture conditions so as to improve their efficacy as biological control organisms, and this stream is well-developed in the book, with some chapters entirely devoted to it.

The editors are to be congratulated for the clear organisation of the book. Each chapter has an abstract followed by a review of the particular aspect – typically marrying theory, empirical evidence, modelling and so on – with a final section giving an invaluable critique of how well the theoretical framework describes the real world, what remains unknown, and what research directions might be taken. Each chapter has its own bibliography, and the work as a whole is well indexed.

It almost goes without saying that the book will be invaluable to anyone with a serious interest in the behavioural ecology of parasitoids or biological pest control, for its comprehensive and authoritative analysis of an important and dynamic field. But it has more general value too. While the mathematical expression of parts of most chapters might seem off-putting to some, its excellent layout and index will make it easy to use by general entomologists wanting a current overview of an included topic, a substantive definition or explanation of an oft-encountered term, or to trace seminal references in this key area of evolutionary biology. At only £45 it should provide excellent value to most academic entomologists, however passing their interest in parasitoids might be.

MARK R. SHAW

BRACHYMERIA TIBIALIS (WALKER) (HYMENOPTERA: CHALCIDIDAE), CONFIRMED AS A BRITISH SPECIES

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ABSTRACT

The chalcidid 'wasp' *Brachymeria tibialis* (Walker) is confirmed as a British species (a previous record from Buckinghamshire in 1932 has long been considered void). A single specimen was swept from a former railway embankment in south-east London, now managed as a local nature reserve. It is described and distinguished from other *Brachymeria* species. On the Continent *B. tibialis* is well known as a parasitoid of moth pupae, including those of burnets, *Zygaena* species. The narrow-bordered five-spot burnet, *Z. lonicerae* (Schev.) subsp. *latomarginata* Tutt was abundant at this site.

INTRODUCTION

On the afternoon of 18 May 2007 I visited Grove Park Nature Reserve at Hither Green, Lewisham, south-east London, as part of the 'All of a buzz in the Thames Gateway' project being undertaken by Buglife, the Invertebrate Conservation Trust. The site, a former railway cutting and broad sloping embankment, is now managed as a local nature reserve, but is still technically brownfield (previously-used) land and complemented the brownfield development sites being studied in the Buglife survey.

Among the insects found in the rough flowery grassland of this gently sloping south-west-facing site was a large, striking, and prettily marked chalcidid wasp. This is not a group that I have previously studied much, but my curiosity for the Chalcidoidea has been aroused since a similar insect, found during the Buglife survey in 2006, proved to be *Brachymeria obtusata* (Förster), a species new to Britain (Jones, 2007). Imagine my surprise when I provisionally identified the Grove Park insect as another *Brachymeria* new to Britain – *B. tibialis* (Walker).

For many years, only one *Brachymeria* species, *B. minuta* (L.), was regarded as being British, but the key by Ferrière & Kerrich (1958) includes several others where suspect specimens had been found in collections or for which there was some confusion as to their true occurrence here. It was using this key that *B. obtusata* (= *B. vicina* Walker) was initially identified in 2006.

Now the *Brachymeria* specimen from Hither Green worked easily to *B. intermedia* (Nees). This provisional identification was backed up using the translated key by Medvedev (1988). Using the universal Chalcidoidea database (*http://www.nhm.ac.uk/research-curation/projects/chalcidoids*) maintained by the Natural History Museum, the currently valid name for this taxon was determined as *Brachymeria tibialis* (Walker). This identification was confirmed by Dr Stephen Compton, of Leeds University, who is collating records of the UK Chalcididae.

DESCRIPTION AND DIAGNOSIS

Brachymeria tibialis is typical of this distinctive chalcidid genus (Plate 5, Fig. 7). Ferrière and Kerrich (1958) include a fine dorsal view illustration [Fig. II] of *B. minuta*, by Arthur Smith, and this is also reproduced on their front cover. Although with a body length of only 5.7 mm (3.0–6.5 mm range is quoted in the literature) *B. tibialis* is a broad stout insect, the head and thorax especially so. Both

head and thorax are strongly sculptured with large, dense punctures; those on the sides of the thorax tending to coalesce into rugae. These punctured areas are covered with thin but pronounced outstanding hairs. The short oval and slightly laterally compressed gaster is more shining, but with some smaller, more scattered punctures and shorter more adpressed hairs.

The hind femora are grossly enlarged, bulbous, each with a row of about 10 small teeth below and behind. The hind tibiae are strongly curved, and each is produced into a strong spine at the apex. The legs, especially the hind pair, are fairly evenly and moderately strongly punctured, but the outer rear faces of the hind coxae are, by contrast, noticeably smooth and shining.

The entire insect is jet black, but brightly and clearly decorated with vivid yellow markings on: the tegulae; front legs from the apical third of the femur, but with a dark mark behind the basal half of the tibia; middle legs from the apical fifth of the femur, but with a similar dark mark behind the basal half of the tibia; hind legs from a distinctive almost circular spot at the apical quarter of the femur, but with the entire inside of the tibia very strongly streaked black. The tarsal claws on all legs are slightly darkened.

Brachymeria tibialis is distinguished from *B. minuta* and *B. obtusata* by its shorter, deeper, blunter and more dorsally and posteriorly rounded gaster, and by the brighter and more extensive yellow markings. The mixture of minute punctures at the apex and larger punctures near the base of the second gastral tergite also serve to distinguish it from these and other European *Brachymeria* species.

Discussion

Chalcidoid wasps are a sorely under-recorded group of insects, because of their relatively small size and the limited availability of identification guides. However, species of *Brachymeria* are comparatively large and obvious, and some are well-known parasitoids of well-studied moth groups, so in Europe as a whole there are numerous locality and breeding records available.

Brachymeria tibialis (= *B. intermedia*) is a common and widespread species throughout much of its extensive range from Central Asia to North Africa, central and southern Europe and is reported as being especially common around the Mediterranean. It occurs as far north as Sweden and was provisionally included in some British checklists following the paper by Bouček (1952), which gives the UK in the known distribution of this species. This may have been connected to the observation by Ferrière and Kerrich (1958) that two specimens were then present in the British collection of the Natural History Museum labelled 'Farnham Royal, England, 6.vi.32'. Despite the apparent clarity of the data labels, these authors also seem to dismiss the accuracy of this Buckinghamshire record by reporting that the specimens 'might quite well have been of continental origin' and state that the species must be regarded as doubtfully British. In a recent study of the zygaenid hosts of *B. tibialis*, Askew & Shaw (2001) also concluded that its occurrence in Britain was not confirmed. Although now definitely found in Britain, the appearance of just a single specimen of this insect remains tantalizingly enigmatic. However, there are reasonable grounds to expect that it is truly established here, and further localities should now be sought. A good means to do this would be to collect its hosts in their pupal stage.

Brachymeria tibialis is recorded from a wide variety of Lepidoptera host species. *Euproctis* and *Lymantria* are most frequently cited as hosts, but Askew & Shaw (2001) also give a large number of rearing records from several *Zygaena* species from Europe, North Africa and the Middle East. It must be no coincidence that the site at Grove Park has a strong and thriving colony of the narrow-bordered five-spot burnet, *Zygaena lonicerae* (Schev.) subsp. *latomarginata* Tutt and its foodplant,

greater bird's-foot trefoil (*Lotus pedunculatus* Cav., formerly *L. uliginosus* Schk.) is abundant there. Although this is a fairly common moth species in Britain, this is one of its inner-most London localities (Plant, 1993). Unfortunately, further visits to the site during 2007 and 2008 have, so far, not produced any more specimens of *B. tibialis* despite regular visits, extensive sweep netting and the collection of a small number of burnet pupae. Unfortunately a fire ravaged part of the long grassland at this site some time in the autumn of 2007, and although the flora is recovering, the burnet population during 2008 seemed much reduced from previous years.

Brownfield sites are increasingly recognized for their important invertebrate faunas (Gibson, 1998), and those in the London and Thames Gateway areas are particularly rich in large numbers of scarce and unusual species (Harvey, 2000; Jones, 2003; Roberts, Harvey & Jones, 2006; Jones, 2008). When *B. obtusata* was discovered on a London Brownfield (Jones, 2007), it was proposed that the arrival of new insect species to these stepping-stone warm, dry and floristically rich habitats along the corridor of the River Thames was only to be expected. A similar submission could equally be made for such a brownfield nature reserve as that at Grove Park, along the corridors provided by the UK railway system.

Acknowledgements

Stephen Compton of the University of Leeds, kindly confirmed the identity of my specimen of *Brachymeria tibialis*. Mark Shaw commented on a draft of this paper. Roger Key photographed the specimen. Nick Pond from the Nature Conservation Section of the London Borough of Lewisham arranged access to the Grove Park Nature Reserve. The 'All of a buzz in the Thames Gateway' project was co-ordinated by Buglife, the Invertebrate Conservation Trust, and was supported by a grant from 'Countdown 2010' funding through Natural England (formerly English Nature).

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CADDISFLIES (TRICHOPTERA) COLLECTED IN THE MALHAM TARN AREA (YORKSHIRE) IN JULY 2006 AND 2007

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Towards the end of my trip to the Lake District (Ross, 2007) I stopped off at Malham Tarn in Yorkshire, which I knew had a long caddisfly species list. Over 70 species have been recorded from the immediate area, making it one of the richest caddisfly localities in the UK (Holmes, 1963). Malham Tarn is remarkable for being the highest lake in England (376 m asl) and is the only locality in the UK where the RDB1 phryganeid species *Agrypnia crassicornis* McLachlan has been recorded. This species is known to 'skate on surface of Tarn at night – and appear to be incapable of flight' (Holmes, 1963, p. 33). Most of the area forms part of the Yorkshire Dales National Park and is owned by the National Trust, however the north side of the tarn is owned by the Field Studies Council who have an education centre there (Malham Tarn House).

My first visit, on 28–29th July 2006, was during the time of a heat-wave so the weather was very hot and dry. I started by looking around a cold spring that forms the inflow to the lake, but was only able to find a couple of specimens (of one species). However, a search along the northern shore of the lake was very rewarding. I have never seen such a concentration of caddisflies in one area, many specimens could be caught with one sweep of the net. Unfortunately I did not find *A. crassicornis*, so for this I knew I had to make a return trip.

I visited again on 20–23 July 2007, this time with light-traps, however the weather was in marked contrast to the year before. It was very wet, cool and a time of severe flooding in parts of England, particularly Gloucestershire. During this trip the only time it was sunny was the afternoon of the 22nd. Caddisflies were not as numerous as the year before.

The localities visited during these trips listed in Table 1 can be divided into: (i) Malham Tarn itself (including shoreline); (ii) localities in the immediate vicinity that are included in Holmes (1963), and (iii) other localities that are a few miles away. For most of the localities (except for the East boat house and Tarn Fen) collecting was done using a sweep net or tubing specimens as they were found.

Some interesting observations were made regarding the most suitable light-traps to use when recording caddisflies. Two commercially available traps were used, a Skinner trap and a Robinson trap. The bulb for the Skinner is set above the trap so the light is able to shine downwards onto the water in the immediate vicinity of the trap, whereas the Robinson has the bulb set within the trap so the light illuminates ground level at a greater distance. It was noticed that the Robinson trap primarily attracted the larger, stronger flying caddisflies and was better at trapping them, whereas the Skinner trap attracted the smaller, weaker fliers (as well as the larger ones) but was not so good at trapping them. So in general the Skinner trap is better for attracting caddisflies next to a water body, but you need to stay around and tube them as they fly in.

Of the species that were collected at Malham Tarn and immediate vicinity, five are not listed in Holmes (1963), however for three of them: *Agapetus fuscipes* Curtis, *Athripsodes albifrons* (L.), *Ithytrichia lamellaris* Eaton, there are post 1970 records from the National Trichoptera Recording Scheme (Ian Wallace pers. comm.). The other two species: *Limnephilus hirsutus* (Pictet) and *Oecetis ochracea* (Curtis) are new

Table 1. Localities in the Malham Tarn area (Yorkshire) where caddisflies were collected in July 2006 & 2007.

Malham Tarn:

North shore [SD 890 672 – SD 897 671], 28–29.vii.06:
Hydroptilidae: *Oxyethira flavicornis* (Pictet), Polycentropodidae: *Polycentropus flavomaculatus* (Pictet), Psychomyiidae: *Tinodes waeneri* (L.), Phryganeidae: *Phryganea bipunctata* Retzius, Limnephilidae: *Limnephilus hirsutus* (Pictet), *L. politus* McLachlan, Leptoceridae: *Athripsodes albifrons* (L.), *A. cinereus* (Curtis), *Mystacides azurea* (L.), *M. longicornis* (L.)

East boat house (on north shore) [SD 895 671], 20–21.vii.07:
Hydroptilidae: *Ithytrichia lamellaris* Eaton, *Agraylea multipunctata* Curtis, Psychomyiidae: *Psychomyia fragilis* (Pictet), *Tinodes dives* (Pictet), *T. waeneri*, Polycentropodidae: *Cyrnus trimaculatus* (Curtis), *Polycentropus flavomaculatus*, Phryganeidae: *Agrypnia crassicornis* McLachlan, *Phryganea bipunctata*, Limnephilidae: *Potamophylax latipennis* (Curtis), *Limnephilus lunatus* Curtis, Leptoceridae: *Athripsodes cinereus*, *Ceraclea fulva* (Rambur), *Ceraclea nigronervosa* (Retzius), *Mystacides azurea*, *M. longicornis*, *Oecetis ochracea* (Curtis)

Immediate vicinity of Malham Tarn:

Inflow spring to Malham Tarn [SD 887 673], 28.vii.06:
Glossosomatidae: *Agapetus fuscipes* Curtis

Tarn Fen [SD 888 672], 22.vii.07:
Psychomyiidae: *Tinodes waeneri*, Polycentropodidae: *Plectrocnemia conspersa* (Curtis), *Polycentropus flavomaculatus*, Limnephilidae: *Limnephilus lunatus*, *L. luridus* Curtis, *L. sparsus* Curtis, *Rhadicoleptus alpestris* (Kolenati), Leptoceridae: *Ceraclea nigronervosa*

Tarn Moss [SD 886 667], 21.vii.07:
Limnephilidae: *Limnephilus luridus*

Outflow stream of Malham Tarn [SD 893 658 – SD 894 662], 22.vii.07:
Hydroptilidae: *Agraylea multipunctata*, Polycentropodidae: *Polycentropus flavomaculatus*

Shallow pond at southern edge of Great Close Mire [SD 906 663], 22.vii.07:
Hydroptilidae: *Agraylea multipunctata*

Gordale Beck [SD 911 655 – 910 664], 22.vii.07:
Rhyacophilidae: *Rhyacophila dorsalis* (*Curtis*), *Psychomyiidae*: *Tinodes dives*,
Polycentropodidae: *Polycentropus flavomaculatus*, Odontoceridae: *Odontocerum albicorne* (Scopoli), Leptoceridae: *Athripsodes cinereus*

Other localities nearby:

Thoragill Beck [SD 890 701], 28.vii.06:
Philopotamidae: *Philopotamus montanus* (Donovan), Psychomyiidae: *Tinodes dives*, Limnephilidae: *Drusus annulatus* (Stephens)

River Skirfare, Arncliffe [SD 934 719], 21.vii.07:
Rhyacophilidae: *Rhyacophila dorsalis*, Glossosomatidae: *Agapetus delicatulus* McLachlan, Hydroptilidae: *Ithytrichia lamellaris*, Psychomyiidae: *Psychomyia pusilla* (Fabr.), Polycentropodidae: *Polycentropus flavomaculatus*, Hydropsychidae: *Hydropsyche siltalai* Dohler, Sericostomatidae: *Sericostoma personatum* (Spence), Leptoceridae: *Athripsodes albifrons*

records for Malham Tarn. Both these species are generally common and it is surprising that they have not been recorded before. In addition, according to Wallace (1991), the following three species are Notable, but all have been recorded at Malham Tarn before: *Limnephilus politus* McLachlan, *Tinodes dives* (Pictet) and *Psychomyia fragilis* (Pictet).

Of the 10 species collected by sweeping on the north shore in 2006, four were not collected by light trap the following year and the light traps attracted an additional 11 species that were not seen in 2006. These differences are to be expected when using different collecting methods, but the markedly different weather conditions at the time may have also had an influence.

Some caddis may have flown from elsewhere to their collection site. However, the current knowledge of the habitat requirements of each species (Wallace, 1991) suggests most were breeding close by. The exceptions might be the tarn records for *A. albifrons, L. hirsutus* and *T. dives* as they are regarded as flowing water species.

Two specimens of the RDB1 species *Agrypnia crassicornis* McLachlan were found, which I was able to photograph and constitute the first live photographs of this species from the UK (Plate 5, Fig. 8). This is a large, pale species with a distinctive wide head and lateral brown eyes. The first specimen was found on the morning of 21.vii.07 on the inside wall of the East boat house, just above the water line. The second came skating across the surface of the water into the boat house that night, attracted to the light of the Skinner trap. Once caught, I tested whether it was true that they cannot fly by releasing it from a tube at height; it dropped straight to the water and skated to the opposite side of the boat house where it then proceeded to climb up the wall. The skate was unidirectional, fast and left a wake. Although it was too fast to see exactly what was happening, it seems likely that it was running on the surface of the water and the edges of its wings left the wake.

As indicated, *A. crassicornis* is only known in the UK from Malham Tarn, where it was discovered in the early 1950s by Kimmins (1952). It is a Eurasian species, widely distributed in Finland, extending across to Russia, from the Gulf of Finland to the Aral Sea, with disjunct populations in Britain and Mongolia (Wiggins, 1998).

Some small white moths were also attracted to the light of the Skinner trap in the East boat house and fascinatingly they flew just above the surface of the water. They were identified as *Acentria nivea* Olivier (= *A. ephemerella* (Denis & Schiffermüller), common name Water Veneer Moth) by David Lees (pers. comm), which is one of the few moths that have aquatic larvae.

Acknowledgements

The author would like to thank Peter Barnard and Ian Wallace (Liverpool Museum) for confirmation of identifications, also to Ian for additional Malham Tarn records, to David Hodgson (National Trust) for taking me to Thoragill and Gordale Becks, to Adrian Pickles (Head of Malham Tarn Field Studies Centre) for permission to collect, to Stuart Croft for handy local knowledge, to David Lees (NHM) for the moth identification, and to Andrew Ross and Paul Brown (NHM) for assistance.

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2007 ANNUAL EXHIBITION

Imperial College, London SW7 – 10 November 2007

The following accounts of the exhibits were compiled by R.D.G. Barrington (British Butterflies), S.P. Clancy (British Macrolepidoptera), R.J. Dickson (British Microlepidoptera), N.M. Hall (Foreign Lepidoptera), P.J. Chandler (Diptera), R.G. Booth (Coleoptera), A.J.A. Stewart (Hemiptera), M.N. Smith (Hymenoptera and other Orders) and J.S. Badmin (General). The photographs of individual insects were kindly taken by Richard Jones. The cost of printing the plates was covered by a grant from the Hammond Memorial Fund.

Approximately forty members and their guests attended the Society's Annual Dinner which took place in the Senior Common Room at Imperial College immediately following the exhibition. The drinks at the bar beforehand allowed everyone to unwind and relax after a busy day looking at specimens and catching up on the latest entomological news, especially about the burnet moths. The sit-down meal was of a high standard and the university's catering staff deserve our thanks. This is one of the very few occasions when members of the Society can socialise and make new acquaintances and it is hoped that more members will attend in future. Mike Simmons, Exhibition Secretary, deserves our special thanks for ensuring that the whole day ran extremely smoothly without any apparent technical hitches.

British butterflies

Bailey, K.E.J. – An exhibit showing the effects of exposing newly-formed pupae of various species to temperature shock. *Apatura iris* L. ab. *iolata* (Cabeau) showing reduced white markings, from heat-shocked pupa and a fine, wild-taken example of the more extreme form, *lugenda* (Cabeau), the latter probably the result of high natural temperatures acting on the newly-formed pupa. *Cynthia cardui* (L.) ab. *rogeri* (Meilhan); *Inachis io* (L.) ab. *extrema* and *Polygonia c-album* (L.), ab. *reichstettensis* (Fettig), all from heat-shocked pupae. Aberrations of *Boloria euphrosyne* (L.) resulting from high temperature treatment on newly-formed pupae whereas low temperatures have little effect. A very interesting comparison between two sets of aberrations of *Boloria selene* (L.) The first, from pupae heat-shocked between 8–12 hours after pupation produced ab. *vanescens* (Cabeau) and the second, heat-shocked when pupae about 20 hours old, produced considerably more melanised aberrations. The exhibitor notes that despite the more black nature of the second batch, the geometry of the aberrant pattern (especially on the under surface) is essentially the same. He suggests this may indicate two phases in pattern formation: an earlier process that determines the essential pattern followed by a process that lays down the pigment upon that pattern. Both phases can be affected by temperature-shock, separately or together depending on the timing of the shock. *Argynnis adippe* (L.) (Plate 6, Fig. 2), a male aberration from captive-bred stock, produced by giving a heat-shock to the pupa. It showed confluent upperside black markings and confluent silver spotting at the base of the underside of the hindwings. This species is very resistant to temperature shock.

Argynnis paphia (L.), a series of the melanic forms ab. *ocellata* (Frings) and ab. *nigrizina (*Frohawk) (melanisation on ab. *valezina* (Esper)) produced from larvae given changes in temperature and daylight routine prior to pupation, followed by cold-shocks to the new pupa (the larval treatment appears to sensitise the new pupa to the effects of extreme temperature). Beautiful aberrations of *Mellicta athalia* (Rott) from captive-reared stock and induced by cold-shocks to the pupa. These

included both ab. *corythallia* (Hübn.) (black pigment reduced on forewings and increased on hindwings) and the extreme melanic ab. *cymothoe* (Bertolini). *Aglais urticae* (L.) aberrations reared from a strain of the genetically polymorphic ab. *pseudoconnexa* (Cabeau). These showed combinations of *pseudoconnexa* with *ichneusoides* (de Selys) (forewing discoidal twin spots absent); *semiichneusoides* (Pronin) (heat-shocked pupae) and *lutea* (Raynor).

Barrington, R.D.G. – Two captured specimens of *Plebejus argus* (L.) with intersex markings (Plate 6, Fig. 6). In this form the insect is basically female but with areas of male scaling mixed in amongst the female scales on the upperside of the wings. On one specimen this affected much of one forewing while in the other a wedge-shaped area of one hindwing was heavily blue. Eggs were obtained by the exhibitor from two such intersexual forms and produced a small brood of female butterflies only, of which several were also intersexual. Intersexes differ from halved or mixed gynandromorphs in that in the latter, areas of wings, or whole wings, are purely of one sex or another (and the clear-cut mosaic effect may be continued on the body) whereas in intersexes the two sexes are finely intermixed together and the body (in the present species at least) appears to remain essentially female (confirmed by dissections carried out many years ago by E.A. Cockayne, although he found that the female sexual organs may be deformed to a greater or lesser degree). Whereas pure gynandromorphs are caused either by the existence of binucleate ova or the loss of a sex chromosome, intersexes are due to an imbalance in the ratios of sex alleles and are most often seen when separate races of a species are hybridised. However several discrete populations of *P. argus* in southern England have been known to produce a considerable proportion of intersexes. *Maniola jurtina* (L.) a female ab. *antiobscura* (Leeds), a form in which the normal fulvous colour of the forewing is replaced by brown scaling. The only similar example known to the exhibitor was a male captured by H.A. Leeds, now housed in the Society's collection.

Butler, A. – *Polygonia c-album* (L.) melanic forms ab. *reichstettensis* (Fettig) and *sagitta-album* (Frohawk) (in the latter the underside comma mark is large and comet-shaped) produced by cold-shocks given to the newly-formed pupae. *Polyommatus icarus* (Rott.) ab. *radiata* (Rott.) from summer pupae given cold-shocks. The exhibitor hopes to prove, by future breeding, that the strain already contained the polygene system for *radiata* and that the temperature shocks exaggerated the phenotype. A remarkable range of aberrations of *Lycaena phlaeas* (L.) from pupae given a single heat-shock and several 24-hour cold-shocks. These included ab. *remota* (Tutt) (forewing spotting thrown outwards), ab. *antico-radiata* (Derenne) on both surfaces (forewing spots elongated outwards into streaks) (Plate 6, Fig. 8), ab. *bipunctata* (Tutt) (all forewing spotting absent except the discoidals) and underside specimens with the spotting streaking inwards to the discoidal, ab. *parallela* (Leeds). A male *Colias alfacariensis* (Berger) found roosting in Dorset on 9.ix..2007.

Callow, M. – A fine example of a male *Polyommatus coridon* (Poda) ab. *alba-ultraradiata* (Bright & Leeds) (Plate 6, Fig. 3). This form has the spotting streaked outwards to the lunules on all wings and the ground colour white. It was captured in Wiltshire on 24.vii.2007 in a population that peaked at no more than 150 butterflies over a two-week period and consisted of only 40 butterflies on the day of capture. Aberrations this extreme in *coridon* have always been rare, although in the past they were found on a fairly regular basis when some of the most famous colonies of the species held populations of butterflies numbering 150,000 or more. Indeed some of the old collectors claimed that colonies holding fewer than this immense number were not worth visiting since they were too small to produce enough aberrations to repay the time invested in searching; a luxury denied present day entomologists.

CARTER, C.I. – Examples of the range of female wing colouration in *Pieris napi bryoniae* (Hübn.) through inbreeding over two generations and cross breeding with ab. *fasciata* Kautz. These were reared under ambient conditions during the summer, cold-stored during the winter at 4°C, all emerging the following spring. One source of *bryoniae* was from Valais, Switzerland; the other from the Tyrol in Austria. Some ochreous specimens appeared to be similar to ab. *flavescens* Wagner, others with forewings spotting much reduced and others with enlarge spotting as in ab. *fasciata*.

HARMER, A.S. – *Lycaena phlaeas* (L.) ab. *radiata* (Tutt) + *caeruleopunctata* (Rühl), bred from a colony that has a history of producing ab. *partimauroradiata* (Leeds) and *obsoleta* (Tutt). *Polyommatus coridon* (Poda), several examples of male ab. *livida* (Bright & Leeds) (Plate 6, Fig. 4) and female ab. *khaki* (Bright & Leeds). These were produced in the following way: In 2005 Brian Fensome captured a male *livida* and secured a pairing with a typical female. Richard Revels captured a *khaki* female from the same location and obtained eggs. Both broods were typical and cross pairings were taken between them, some of the ova being sent to the exhibitor, which produced the following adults: 8 typical male, 6 typical female, 2 male *livida* and 7 *khaki* females. Richard Revels' share of the eggs produced: 11 typical males, 7 typical females and 1 *khaki* female. In combination the ratio of these broods was 19 typical male, 13 typical female, 2 *livida* male and 7 *khaki* female. This gives a type to aberration ratio of 4.5: 1 – close to the expected ratio for a recessive aberration of 4:1. This experiment confirms that *livida* and *khaki* are the male and female expressions of the same gene and should logically come under the same name. The exhibitor expresses his thanks to Richard Revels for the opportunity to breed this aberration. Three captured aberrations of *Polyommatus bellargus* (Rott). from the Purbecks, Dorset. One was a female *discoidalisnulla* (Tutt), another *krodeli* (Gillmer) and the third, and most interesting, was what appears to be a gynandromorph with forewings and body typically female and hindwings that appear entirely male (Plate 6, Fig. 5). A similar specimen was taken in the same locality by A. Butler (*Br. J. Ent. Nat. Hist. Soc.* **13**: 152), suggesting the possibility of an inherited factor for this type of gynandromorphism

JONES, A. M. – A fine, captured, pair of *Argynnis paphia* (L.) ab. *confluens* (Spuler) (Plate 6, Fig. 1). It has been suggested that melanic aberrations of this species which, in the wild, are almost certainly produced by unusually high, natural temperatures acting on the newly formed pupa occur more regularly nowadays (the exhibitor is able to record them in some locations almost every year) than in the past (when very few indeed were recorded in the 20 or more seasons that passed, on average, between famous '*paphia* aberration years'). This would seem to be a demonstration of global warming. A male *A. paphia* with reduced marginal/submarginal spotting and heavier than typical androconial bands. In the exhibitor's experience this is a much rarer form of variation in the species than the more striking confluent/melanic aberrations. A female *paphia* with strong homoeosis (patches of underside hindwing pattern being reproduced on the forewings). This was bred in an F_1 generation from a similarly-marked female taken in July 2006. Previous breeding experiments by the exhibitor have shown homoeosis in this species to be heritable, though not on a simple Mendelian basis.

LUCKENS, C.J. – Five varied forms of *Polyommatus bellargus* (Rott.) showing reduced or absent underside spotting, captured early June 2007 in Wiltshire. A male *Argynnis lathonia* (L.) captured at Newenden, Kent, 25. viii.2007.

TEBBUTT, P. – The results of subjecting early pupae of *Satyrium pruni* (L.) to two different temperature regimes. A long cold-shock caused the white 'hairstreak' to disappear; ab. *albobsoleta* (Verity). A single heat-shock resulted not only in the absence of the 'hairstreak' but in a much paler ground colour and elongation of the

black marginal spots (an unnamed aberration). Three captured aberrations: *Boloria selene* (D.&S.) ab. *flavescens* (Lempke) showing a pale ground colour that was obvious in flight. A male *Apatura iris* (L.) extreme ab. *iolata* (Cabeau), transitional to ab. *lugenda* (Cabeau). A beautiful *Lycaena phlaeas* (L.) ab. *schmidtii* (Gerhardt) showing yellow-white instead of copper (Plate 6, Fig. 7). Curiously this was the only specimen of the species seen in the location over an 18 day period.

British macrolepidoptera

Brown, D.C.G. – An example of *Sedina buettneri* (Her.) taken at Dunwich, East Suffolk on 16.x.2007, the second county record following the first in 2006. Also exhibited was a heavily-marked specimen of *Cabera exanthemata* (Scop.) taken by S.D. Taylor at Pitlochry, Perthshire on 16.vii.2007.

Clancy, S.P. – An exhibit that included the following specimens from the Dungeness area, E. Kent: *Eupithecia ultimaria* Boisd., the first county record from Lydd-on-Sea, 24.v.2007; *Colotois pennaria* (L.), a heavily suffused specimen from New Romney, 12.xi.2006; *Diaphora mendica* (Clerck), a pale-brown male example, New Romney, 14.iv.2007; *Agrotis crassa* (Hübn.), an immigrant male, Lydd-on-Sea, 17.viii.2007; *Hadena perplexa* (D.&S.), a banded form, Lydd-on-Sea, 5.viii.2007 (Plate 7, Fig. 4); *Orthosia opima* (Hübn.), a female of the saltmarsh form, New Romney, 16.iv.2007; *Orthosia gothica* (L.), two specimens exhibiting the extremes of variation in the extent of the black forewing markings: examples of ab. *separata* from New Romney, 18.iv.2007 & ab. *circumsignata* from Dungeness, 29.iii.1990; *Omphaloscelis lunosa* (Haw.), two examples of a striking, unnamed aberration exhibiting strongly defined blackish interneural suffusion in the terminal areas of the fore and hindwings; from Dungeness, 7.x.2002 & 10.x.2007 (Plate 7, Fig.5); *Proxenus hospes* (Frey.), two of four specimens taken in the Dungeness area during 2007, from Greatstone on 24.vii. & 16.viii.2007; and *Minucia lunaris* (D.&S.), the second area record from New Romney, 11.v.2007.

Also shown were a number of species recorded at Ballycotton, Co. Cork, Eire on 9.vi.2007. These included *Scopula marginepunctata* (Goeze), two examples of ab. *grisea* with a comment that all the examples of this species seen were of this form; *Spilosoma lubricipeda* (L.), an example of ab. *brunnea*; *Diaphora mendica* (Clerck), two 'dirty-white' male specimens; *Heliophobus reticulata hibernica* Cock., two specimens, with a comment that at least 23 examples were recorded; *Hadena andalusica barrettii* (Doubl.), two brown, obscurely-marked specimens of a large number seen; and *Hadena caesia* (D.&S.), a single specimen.

Clarke, J.H. – Two exhibits of species recorded or bred in 2007, one comprising of species recorded in Ireland during June that included the following: *Zygaena lonicerae insularis* Trem., Armagh; *Eupithecia intricata hibernica* Mere, ex. larvae, Burren, viii.06; *Lomaspilis marginata*, ab. *diluta*, Burren; *Hyles livornica* (Esp.), one of a total of five seen on 16 & 17.vi. at Mizen Head, Co. Cork; *Spilosoma lubricipeda* (L.), two examples of ab. *brunnea* from the Burren; *Standfussiana lucernea* (L.), a dark form from Mizen Head, Co. Cork and a pale form from the Burren; *Heliophobus reticulata hibernica* Cock., Mizen Head, Co. Cork; *Hadena andalusica barrettii* (Doubl.), examples from Bullens Bay and Mizen Head, Co. Cork, a more variegated form recorded from the former site; *Hadena caesia* (D.&S.), specimens recorded at Mizen Head, Co. Cork and bred from 2006 larvae from Slea Head, Dingle, Co. Kerry; *Acronicta euphorbiae myricae* (Guen.), a dark form from Mizen Head, Co. Cork and a pale form from the Burren; *Deltote bankiana* (Fabr.), a specimen taken on 15.vi., Glengariff Wood, Co. Cork.

The second exhibit comprised a selection of species recorded or bred in 2007 from a variety of widely distributed sites that included the following: *Ennomos autumnaria* (Werneb.) from Playden, E. Sussex; *Selenia lunularia* (Hübn.) from Feshiebridge, Inv.; *Mimas tiliae* (L.), ab. *brunnea* from Roydon, Norfolk; *Hadena caesia* (D.&S.) from Talisker Bay, Skye; and *Plusia putnami gracilis* Lempke from Skipton, Yorkshire.

COOK, R.R. – Some moths taken or reared during 2005-2007, including: *Epirrhoe tristata* (L.), bred from a female taken at Struan, Perthshire on 5.vii.04; *Macaria signaria* (Hübn.) from Barham, Kent on 28 & 29.vi.06; *Hyles livornica* (Esp.), an example from Ferndown, Dorset on 28.viii.06; *Miltochrista miniata* (Forst.), an example of ab. *flava* from Ferndown, Dorset on 29.vii.06 shown with a typical specimen; *Platyperigea kadenii* (Frey.), third brood examples bred from a female taken at Cooden, E. Sussex; *Macdunnoughia confusa* (Steph.), a specimen bred from a female taken at Puddletown, Dorset, ix.06; *Pechipogo strigilata* (L.), a specimen reared to adulthood from a larva found in Harewood Forest, Hampshire, ix.05.

DEANS, M. – Moths taken in East Suffolk in 2007: *Idaea ochrata* (Scop.), Bawdsey, 16.vi., the first county record of this species since the apparent extinction of a breeding population c.1990; *Hyles gallii* (Rott.), Bawdsey, 22.viii.; *Lithosia quadra* (L.), Bawdsey, 18.vii.; *Eurois occulta* (L.), Bawdsey, 22.viii.; *Hecatera dysodea* (D.&S.), Bawdsey, 1.viii.; *Mythimna obsoleta* (Hübn.), Bawdsey, 20.vi.; *Calophasia lunula* (Hufn.), Bawdsey, 29.iv.; *Conistra rubiginea* (D.&S.), Bawdsey, 16.iv., new to Suffolk; *Cryphia algae* (Fabr.), Bawdsey, 13.vii. & 5.viii.; *Proxenus hospes* (Frey.), Bawdsey, 9 & 21.viii., third & fourth county record; *Catocala sponsa* (L.), Dunwich Heath, 13.viii. (captor: C. Moore), first modern county record; and *Parascotia fuliginaria* (L.), Hollesley, 11.vii (captor: N. Mason), fifth county record.

DOBSON, A.H. – Moths caught in 2007 from a Rothamsted trap at Starcross, S. Devon, including *Xestia xanthographa* (D.&S.) taken in mid-June, and a minor aberration of *Lasiocampa quercus* (L.) with a darkened basal area to the forewing. Also shown were an example of *Noctua comes* (Hübn,) from Basingstoke, N. Hampshire, showing a split hindwing lunule, and *Abrostola triplasia* (L.) taken on 17.v. at Headley Gravel Pits, N. Hampshire.

ELLERTON, J. – A sample selection of species from the collection of the exhibitor taken between 1960 and 1970. These were exhibited by Leicestershire County Council Heritage Services to whom this collection has been bequeathed; the species exhibited including *Phibalapteryx virgata* (Hufn.) from Icklingham, Suffolk, *Rheumaptera hastata* (L.) and *Plemyria rubiginata* (D.&S.) from Leenane, Co. Galway, *Lycia zonaria britannica* (Harr.) from Conway, Caernarvonshire, and *Lithomoia solidaginis* (Hübn.) from Dalmigavie, Inverness-shire.

HALL, N.M. – Several species of local interest taken in Berkshire during the 2007 season: *Euplagia quadripunctaria* (Poda), Reading, 10.viii., the first VC22 record; *Eupithecia phoeniceata* (Ramb.), Reading, 12.x., the second or third VC record; *Mythimna vitellina* (Hübn.), Reading, 15.vi.; and *Cucullia absinthii* (L.), Reading, 13.vii. (Captor: M. Calway). In response to a number of incorrectly identified specimens at last year's exhibition, NMH also showed specimens of *Noctua janthina* (D.&S.), *Noctua janthe* (Borkh.), *Ochropleura leucogaster* (Frey.), and *Ochropleura plecta* (L.), in an attempt to clarify the differences between each of these two species pairs.

HAWKINS, R.D. – A dark example of *Hecatera dysodea* (D.&S.), reared from a number of larvae found in Stoke Park, Guildford, Surrey, on 16.viii.2007.

HAYWARD, R. – An exhibit mainly consisting of species recorded from Wokingham, Berkshire during 2007, the most interesting of which were examples

of *Tethea or* (D.&S.) on 16.v.; *Eilema caniola* (Hübn.) on 23.ix. & 7.x. (erroneously stated to be the first VC22 records; see I.D. Masters exhibit); *Orthosia populeti* (Fabr.) on 12.iii; and *Mythimna albipuncta* (D.&S.) on 23.ix.. A number of minor aberrations were also shown that included a melanic example of *Erannis defoliaria* (Cl.), and the ab. *gothicina* form of *Orthosia gothica* (L.), both from Wokingham. Also shown from the same site were unseasonal examples of *Erannis defoliaria* (Cl.) (an early specimen on 5.ix.07) and *Nola confusalis* (H.-S.) (a late specimen on 28.vii.07).

HENWOOD, B.P. – Photographs of larvae of *Hemithea aestivaria* (Hb.) showing the presence of algal growth on their external surface.

HONEY, M.R. – Two moths of note taken in 2007 at the London Wetland Centre, Barnes, Surrey: *Cryphia algae* (Fabr.), two examples taken on 3.viii., exemplifying the rapid spread of the breeding population of this species across the London area; *Spodoptera littoralis* (Boisd.), the second county record taken on 22.vi. (exhibit legend incorrectly dated 27.vi.).

KIDDIE, R. – Two male examples of *Dendrolimus pini* (L.) taken near Inverness, Inv. on 19 & 22.vi.2007, from a locality adjacent to where an example of this species was taken in 2004. Also shown was a specimen of *Platyperigea kadenii* (Frey.) taken in Gravesend on 7.x.2007, possibly the first VC16 record of this species.

KNILL-JONES, S.A. – A wide selection of species recorded at Totland, Isle of Wight during the 2007 season, the most significant of these as follows: *Cyclophora puppillaria* (Hübn.), 12.x. & 3.xi.; *Euphyia biangulata* (Haw.), 31.viii.; *Cleorodes lichenaria* (Hufn.), possible immigrants on 18 & 19.vi.; *Hyles livornica* (Esp.), 18.vi.; *Orthosia opima* (Hübn.), 16.iv.; *Trigonophora flammea* (Esp.), 3.xi.; *Xylena vetusta* (Hübn.), 15.iv.; *Sedina buettneri* (Her.), 12.x, the first VC10 record since the extinction of the breeding colony in the 1950s; *Catocala fraxini* (L.), 6.x.; and *Hypena obsitalis* (Hübn.), 28.viii. However, the exhibit was rather dominated by the spectacular example of *Actias selene* (Hübn.) (Indian Moon Moth) which must have been a shock to the exhibitor when encountered in his light-trap on 10.viii.2007.

MASTERS, I.D. – An example of *Eilema caniola* (Hübn.) from Owlsmoor, Sandhurst, Berkshire, on 5.viii.2007 (following three records from the same site in 2006, suggesting the presence of a local breeding population); an example of *Eurois occulta* (L.) from Middleton-on-sea, W. Sussex, on 25.viii.2007; and examples of *Ptilodon cucullina* (D.&S.) from both the Owlsmoor & Middleton localities, new to both sites in 2007.

MCCORMICK, R.F. – Species of interest recorded in Devon during 2007 by a number of recorders, although the specimens shown were not necessarily those recorded during the 2007 season. Species exhibited included the following: *Drepana curvatula* (Borkh.), the first county record from Uplyme on 2.vi; *Tetheella fluctuosa* (Hübn.), Shaugh Prior, 14.vi, the first confirmed county record with two more subsequent records during the season; *Idaea trigeminata* (Haw.), only the second confirmed record in the county from Kingsteignton on 11.vi; *Costaconvexa polygrammata* (Borkh.), a record from Ermington on 10.vi, the third successive year this species has turned up in the county; *Diarsia dahlii* (Hübn.), a series of records from the Watersmeet area following the first confirmed Devon record from this area in 2006; *Eurois occulta* (L.), the fifth and sixth county records from Tytherleigh on 23.viii and Rockbeare on 25.viii; ii., the first county records; *Papestra biren* (Goeze), a specimen from Teignmouth on 5.v, the first VC3 record since 1989; *Platyperigea kadenii* (Frey.), at least seven county records of this species in 2007 showing further westerly spread across Devon; *Parascotia fuliginaria* (L.), the second county record from Exeter on 23.vi.

Also shown were a number of species recorded in 2007 during a week long trip to the Burren, Eire, that included examples of *Zygaena purpuralis sabulosa* Trem., *Eupithecia pulchellata hebudium* Sheld., *Eupithecia distinctaria constrictata* Guen., and *Photedes captiuncula tincta* (Kane). Examples of *Macaria signaria* (Hübn.) were also exhibited from a series secured at the site of the main Kentish colony of this species.

OWEN, J. – Moths from the exhibitor's garden near Dymchurch, E. Kent in 2007, the most significant of these being the first county record of *Lithostege griseata* (D.&S.) taken on 10.vi. Also shown were four examples of *Proxenus hospes* (Frey.) recorded on 16.viii, 23.viii (2) and 24.viii.; and the second site record of *Macdunnoughia confusa* (Steph.) taken on 14.ix.

PAGE, A. – Some moths taken at the exhibitor's home in the New Forest at Linford, Hants that included examples of *Hyles livornica* (Esp.), taken on 4.ix.2006; *Diachrysia orichalcea* (Fabr.), taken on 15.x.2006; and three local species said to be recorded most years from this site: *Agrochola haematidea* (Dup.), *Moma alpium* (Osb.) and *Catocala promissa* (D.&S.). Other species shown included bred examples of *Platyperigea kadenii* (Frey.) from Bexhill, E. Sussex; *Hydrelia sylvata* (D.&S.) from Rewell Wood, E. Sussex; and *Macaria signaria* (Hübn.) from near Barham, Kent.

PLANT, C.W. – An example of *Actinotia hyperici* (D.&S.) taken in a garden light-trap in Wembley, Middlesex on 22.v.2007 by G. Geiger. The first Middlesex and sixth British record of this species (see also P. Sharpe exhibit).

PLATTS, J. – Bred specimens of *Platyperigea kadenii* (Frey.), reared from a female taken at Kingsdown, Kent, on 24.ix.2006; one of two examples of *Tristateles emortualis* (D.&S.) taken in mixed woodland near Canterbury, Kent, where this species may now be breeding; an aberration of *Ochropleura plecta* (L.) with the pale costal marking reduced to a narrow line (Plate 7, Fig. 6), taken at Powerstock, Dorset on 23.v.2007.

RUSH, J. – An extreme aberration of *Tetheella fluctuosa* (Hübn.), from High Vinnals, Herefordshire on 12.vi.2007 (Plate 7, Fig. 3).

SOKOLOFF, P. – Three species of local interest taken in Orpington, West Kent in 2007: *Apoda limacodes* (Hufn.), 14.vii.; *Eupithecia phoeniceata* (Rambur), 9.ix., one of six records in 2007 after only three previous site records; and *Abraxas sylvata* (Scop.), 9.viii. Also shown from the same site were minor aberrations of *Xanthorhoe fluctuata* (L.) and *Atethmia centrago* (Haw.).

SHARPE, P. – No exhibition notes supplied, but this exhibit comprised a selection of moths taken in Kent, the most significant of these being the seventh British specimen of *Actinotia hyperici* (D.&S.) from Folkestone on 14.vii.2007.

WARING, P. – Six exhibits covering a variety of topics as follows: (1) An illustrated account of two events introducing primary school children to moths. (2) & (3) The tabular comparison of the effectiveness of four types of insect light-trap, with photographs of the relevant traps in operation. (4) An illustrated account of a three day visit to the Burren, Co. Clare. (5) Live larvae of *Orgyia recens* (Hübn.). (6) A series of photographs associated with the discovery of larvae of *Rheumaptera hastata* (L.) in the Ballintempo Forest, Co. Fermanagh, on 16.viii.2007; apparently the first time the larvae of this species have been found in Northern Ireland.

WILSON, D.E. – An example of the rare ab. *nigrescens* form of *Peridea anceps* (Goeze) from Blythburgh, E. Suffolk on 10.iv.2007 (Plate 7, Fig. 2). Also from the same site on 9.v.2007, a more frequent aberration of *Ochropleura plecta* (L.) showing a broadened pale costal streak on the forewing.

YOUNG, D. – A selection of interesting species taken or bred by the exhibitor in recent years that included examples of *Agrius convolvuli* (L.), *Hyles gallii* (Esp.),

Noctua orbona (Hufn.), and *Xestia rhomboidea* (Esp.) from various sites in Suffolk. Also shown were minor aberrations or recurrent forms of *Opisthograptis luteolata* (L.), *Odontopera bidentata* (Cl.), *Arctia villica* (L.), *Diacrisia sannio* (L.), and *Noctua comes* (Hübn.).

YOUNG, M. – A bilateral mosaic example of *Noctua pronuba* (L.) taken at Oldmeldrum, Aberdeenshire on 2.viii.2007 (Plate 7, Fig. 1); and an aberrant *Xanthorhoe montanata* (D.&S.) with reduced dark scaling on the forewing, taken at Portsoy, Banffshire on 30.vi.2007 (Captor: R. Leverton).

BRITISH MICROLEPIDOPTERA

AGASSIZ, D. J. L. – *Prays peregrina* (Yponomeutidae) new to science – published in *Nota lepidopterologica* on 15th November 2007. All the specimens recorded are from Greater London. The origin of the species is unknown, possibly Asia. Its life history is unknown.

BEAUMONT, H.E. – *Oegoconia deauratella* (H.-S.), West Melton, Rotherham, S. Yorks. (VC63), 15.vii.2007 (second county locality); *Scrobipalpa salinella* (Zeller), Spurn NNR, East Yorks. (VC61), 17.vi.2007 (B.R. Spence leg.), det. HEB (first Yorkshire record); *Infurcitinea argentimaculella* (Stainton), Elvedon Forest, West Suffolk (VC26), larval tubes on oak trunks 15.v.2007, moth reared 28.vii.2007 (first VC26 record); *Cnephasia genitalana* Pierce & Metcalfe; Elveden Forest, West Suffolk, VC26, 9 & 12.vii.2007; *Epinotia granitana* (H.-S.), Elveden Forest, West Suffolk, VC26, at rest on an oak trunk bordering a plantation of mature Norway spruce, the larval foodplant, 15.v.2007, new to Britain.

BLAND, K.P. – *Cnephasia longana* (Haworth), Anstruther, Fife (VC85) NO5603, at light, August 2007, A-M. Smout. There have been three separate records of this species from southern Scotland in 2007 and it seems to be expanding its range. *Elachista megerlella* (Hübn.), Cragbank NNR, Roxburghs (VC80), NT5807, leafmine in *Arrhenantherum elatius* (L.) 23.vi.2007, emerged 29.vii.2007. There are only two old unauthenticated records for this species from Scotland [viz. Dumbartonshire 1901 and East Lothian 1928]; *Cydia compositella* (Fabr.), Long Newton railway cutting, Roxburghs (VC80) NT5826, by day, 24.vi.2007. New to south-east Scotland: all previous records are from the north and west of Scotland.

CLANCY, S. – *Cydia pactolana* (Zeller), Thetford (VC26), 23.5.2007; *Eccopisa effractella* Zeller, 1♂, Dungeness (VC15), 14.ix.2006, second British and first Kent record; *Sciota rhenella* (Zincken), Greatstone (VC15), 20.vi.2005 and St. Margaret's Bay (VC15), 8.vii.2006, A. Morris, the only two British specimens, to show the variation within this species. The second specimen was exhibited as *S. hostilis* (Stephens), on behalf of the captor at the 2006 Exhibition.

DEANS, M.– *Cnaemidophorus rhododactyla* (D.& S.), Lower Hollesley Common, East Suffolk (VC25) TM348463, at mv, 10.vii.2007 (M. Deans and N. Mason) and Bawdsey, East Suffolk (VC25) TM335380, at mv, 12.vii.2007 (M. Deans) new to site. *Vitula biviella* (Zeller), Bawdsey, East Suffolk (VC25) TM335380, at mv, 13.vii.2007 (M. Deans), recent Suffolk colonist; *Loxostege sticticalis* (L.), Wantisden, East Suffolk (VC25) TM359514, found by day, 6.ix.2007, (N. Mason), rare migrant in Suffolk; *Sitochroa palealis* (D.&S.), Bawdsey, East Suffolk (VC25) TM335380, at mv, 17.viii.2007 (M. Deans), first for site.

DOBSON, A.H. – *Argyresthia trifasciata* Staudinger, Brighton Hill, Basingstoke, North Hampshire (VC12), bred from a brown shoot of X *Cupressocyparis leylandii* collected 2.i.2007, emerged 6.v.2007; and a specimen from Kempshott, Basingstoke, North Hampshire (VC12), at mv light, 17.v.2007 (G.A. Henwood, leg.), both new

records for the area. *Cameraria ohridella* Deschka & Dimic, Palace Hotel grounds, Torquay, South Devon (VC3), just two mines on *Aesculus hippocastanum* collected on 17.vii.2007, emerged 19.vii.2007. The third record for this species new to Devon in 2007. *Sophronia semicostella* (Hübn.), Headley Gravel Pits, North Hampshire (VC12), 11.vii.2007 (a new locality for this species which is scarce in North Hampshire); *Bryotropha domestica* (Haworth), Brighton Hill, Basingstoke, North Hampshire (VC12), at flat lights, 31.vii.2007.

ELLIOTT, B. – *Cydia millenniana* (Adamczewski), Mildenhall district, Suffolk (VC26) TL7475 galls on *Larix*, mostly high up, May 2006, emerged round about the end of the month; *Nemapogon variatella* (Clemens), (VC20) TL3339, bred from a rot hole in a beech tree that contained an unidentifiable decayed fungus, collected March 2007; *Hypatopa binotella* (Thunb.), Blastobasidae, Micheldever district (VC12) SU5244, to mv light, 18.vii.2006, det. Dr. J.R. Langmaid, new to the British Isles, and believed by the exhibitor to be breeding in the area; *Assara terebrella* (Zincken), Rhinefield, New Forest, South Hampshire (VC11) SU2604, a number of imagines bred from aborted *Picea abies* cones lying amongst litter on the forest floor, April 2007; *Periclepsis cinctana* (D.&S.), Balphetrish, Island of Tiree (VC 103) NM0147, 26.vi.2007, common, but very local – last recorded here by Young & Harper in 1984; *Anacampsis temerella* (Lienig & Zeller), North Coll. at Cornaegbeg (VC103) NM2363, bred commonly from *Salix repens* from one area, where it was discovered by Keith Bland in 1983; *Depressaria ultimella* Stainton, Luccombe Chine, Isle of Wight (VC10) SZ5879, several pupae were seen in stems of *Apium nodiflorum* (new to VC); *Stigmella poterii* (Stainton), Emer Bog, South Hampshire (VC11), mines locally common for two years on *Potentilla palustris*, a new pabulum. Surprisingly there were none this year. *Altenia scriptella* (Hübn.), larval feeding on *Acer campestre,* Taunton district, South Somerset (VC5) ST1728; *Stenoptinea cyaneimarmorella* (Millière), one, Rewell Wood, West Sussex (VC13) SU9909, to mv, 2006, det. Dr. J.R. Langmaid, first record for over a hundred years. Sampling of detritus and various fungi in spring 2007 failed to provide any clue to its biology. *Dasystoma salicella* (Hübn.), New Forest, South Hampshire (VC11) SU3406, larvae very locally on *Myrica gale*.

FINCH, A. – *Diplodoma laichartingella* (Goeze), Elveden Forest, Center Parcs, West Suffolk (VC26), TL7980, larval case on pine 15.v.2007, emerged 7.vi.2007, G.L. Finch; *Phyllonorycter platani* (Staudinger), Attenborough Arboretum, Knighton, Leicester (VC55), SK600015, mine in London plane 30.ix.2006, emerged 4.v.2007 G.L. Finch; *P. blancardella* (Fabr.), Shenton House garden, Shenton, Leicestershine (VC55) SK3800, mine on cultivated apple 'Golden Hornet', emerged 20.iv.2007, M. A. Finch; *P. spinicolella* (Zeller), Shenton House garden, Shenton, Leicestershire (VC55) SK3800, mine on blackthorn 29.x.2006, emerged 24.iv.2007, M. A. Finch; *P. acerifoliella* (Zeller), Odiham Common, Hampshire (VC12) SU7572, mine on field maple 22.x.2006, emerged 20.iv.2007 M.A. Finch; *P. acerifoliella* (Zeller), Shenton House garden, Shenton, Leicestershire (VC55) SK3800, mine on field maple 29.x.2006 emerged 24.iv.2007, R. Smith; *P. platanoidella* (Joannis), Shenton House garden, Shenton, Leicestershire (VC55) SK3800, mine on Norway maple 29.x.2006 emerged 27.iv.2007 M.A. Finch; *P. platanoidella* (Joannis), North Farm, Dadlington, Leicestershire (VC55), mine on Norway maple 12.xi.2006, emerged 26.iv.2007, M.A. Finch; *P. geniculella* (Raganot), North Farm, Dadlington, Leicestershire (VC55), mine on sycamore 12.xi.2006, emerged 26.iv.2007, M.A. Finch; *Swammerdamia pyrella* (Villers), Herringfleet, East Suffolk (VC25) TM4698, larva on Hawthorn 14.x.2006, emerged 24.iv.2007 T. Pritchard det. Tony Pritchard; *Antispila metallella* (D.& S.), Llangors Breconshire (Powys) (VC42), flying

in afternoon sunshine 29.iv.2007 G.L. Finch det. Norman Lowe; *Metriotes lutarea* (Haworth), Llangors, Beconshire (Powys) (VC42) SO141276, flying in afternoon sunshine 29.iv.2007 G.L. & M.A.Finch det. Norman Lowe; *Eidophasia messingiella* (F.v.R.), Shenton Cutting, Leicestershire (VC55) SK397001, at m.v. light 23.iv.2007, G.L. Finch.

HALL, N. – *Crocidosema plebejana* Zeller, Harcourt Drive, Reading, Berkshire, at mv 12.x.2007; *Evergestis extimalis* Scopoli, North Seat, Hastings Country Park, East Sussex, at mv 25.viii.2007, new to site.

HENWOOD, B. – *Nephopterix angustella* (Hübn.), Newton Abbot, South Devon (VC3), from spindle with berries showing the signs of larval infestation. The moth has been recorded much more frequently in Devon over the last two years.

HONEY, M.R. –London moths: two specimens of note from Surrey (VC17). *Cydia strobilella* (L.) London Wetlands Centre, Barnes, Surrey (VC17), 27.iv.2007. Until that date there was only one recent record of *C. strobilella* from Surrey, and that was north west of Haslemere in the far south-west of the county. This year, specimens have also been taken in two other localities. *Coleophora sternipennella* (Zetterstedt), taken at home (Southfields) on the kitchen window on 2.x.2007. A late individual and only the fourth recent record for Surrey.

KNILL-JONES, S. – Records from Totland, Isle of Wight (VC10) – *Phlyctaenia perlucidalis* (Hübn.), 5.vi.2007; *Dioryctria abietella* (D.&S.), 1 & 9.vi.2007; *Pyralis farinalis* (L.), 1.viii.2007; *Udea fulvalis* (Hübn.), in garden by day, 5.vii.2007; *Eudonia truncicolella* (Stainton), 10.ix.2007; *Pleuroptya ruralis* (Scopoli), a dark form, 8.vii.2007; *Orthopygia glaucinalis* (L.), 17.vii.2007; *Homoeosoma nebulella* (D.&S.), 1 & 26.viii.2007; *Pempelia palumbella* (D.&S.), 9.vi.2007; *Agonopterix ocellana* (Fabr.), 3 & 15.iv.2007; *Pleurota bicostella* (Clerck), 4.v.2007; *Cydia amplana* (Hübn.), 27.viii.2007; *Semioscopis steinkellneriana* (D.&S.), 16.4.2007; *Agonopterix nervosa* (Haworth), 12 & 21.vii.2007.

LANGMAID, J.R. – *Phyllocnistis ramulicola* Langmaid & Corley, 2007, two specimens bred from cocoons found on *Salix cinerea* at Havant Thicket, South Hampshire (VC12) SU7110, September to November 2006, new to science, exhibited with a specimen of *P. saligna* (Zeller) for comparison. Also exhibited were some twigs of *Salix caprea, S. cinerea, S. aurita, S. fragilis* and *S. viminalis* collected on 8.ix.2007 at Havant Thicket, to demonstrate the mines in the stems and cocoons on the leaves. *Bucculatrix ulmifoliae* Hering, two specimens bred from *Ulmus pumila* × japonica at Farnham, Surrey, October 2006 and June 2007, plus the sooty blackish cocoons, new to British Isles. Also exhibited was a specimen of *B. ulmella* Zeller for comparison. *Coleophora calycotomella* Stainton, two specimens bred from *Cytisus scoparius*, Hambledon, Surrey, May 2007, with four larval cases; *Monopis imella* (Hübn.), a specimen with a dull orange dorsal streak, Southsea, South Hampshire (VC11), 12.vi.2007; *Zelleria hepariella* Stainton, a specimen with a broad whitish streak on forewing, Llangynidr, Brecs, 6.iv.2007.

MCCORMICK, R.F. – Interesting species seen in Devon during 2007. *Celypha aurofasciana* (Haworth) Great Plantation 14.vii.2007 and Brookings Down Wood 24.vii.2007; *Eudonia lineola* (Curtis) larvae taken from Bolberry Down under *Parmelia* sp. (lichen) on rocks, moth bred 8.vii.2007; *Anania verbascalis* (D.&S.), Teignmouth Garden, Paradise Road, at light 19.7.2007 (second record for Devon) and Lincombe, near Sidmouth 28.vii.2005 I. Lakin (first record for Devon); *Orthopygia glaucinalis* (L.), Watersmeet, Two Moors Way, at light 24.viii.2007 (third record for VC 4) and Zeal Monochorum, at light, 23.vii.2007 and 22.viii.2007, S.Beavan (first and second records for VC4); *Ephestia kuehniella* Zeller, Holcombe, at light 9.vii.2007; *Elegia similella* (Zincken), Rockbeare, near Exeter, at light,

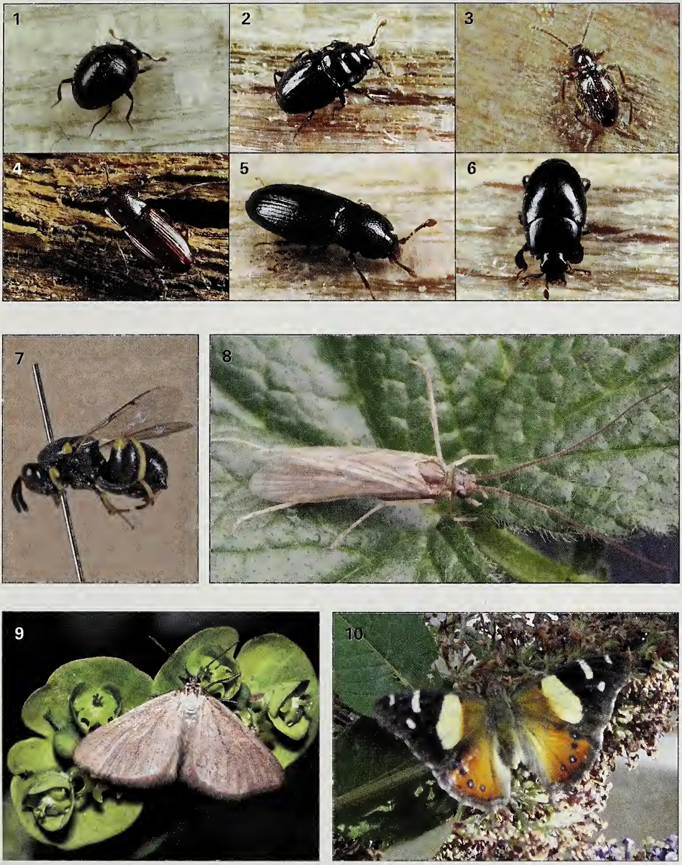

PLATE 5.

Figs. 1–6, Coleoptera in decaying heartwood, 1. *Abraeus perpusillus*, 2. *Plegaderus dissectus*, 3. *Stenichnus godarti*, 4. *Cerylon ferrugineum*, 5. *Cerylon histeroides*, 6. *Paromalus flavicornis*. Photos: Frank Köhler. Fig. 7. Female *Brachymeria tibialis*, from Grove Park Nature Reserve, Lewisham, London, 18 May 2007. Photo: Roger Key. Fig. 8. *Agrypnia crassicornis*, male, Malham Tarn, Yorkshire, 21 May 2007. Photo: E. Ross. Fig. 9. Drab looper *Minoa murinata*. Photo: D. Green. Fig. 10. *Vanessa itea*, Newington, Kent, 14 August 2008. Photo: V. Jewess.

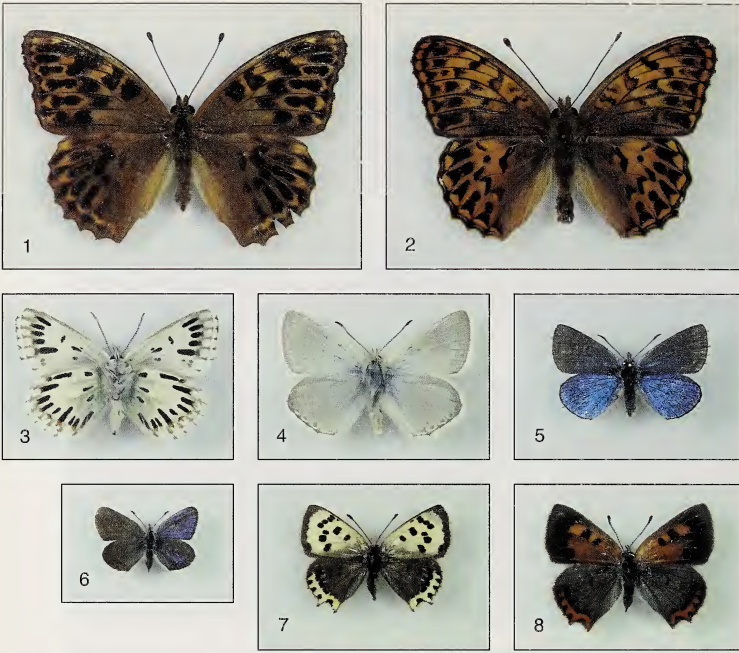

PLATE 6. ANNUAL EXHIBITION
10 NOVEMBER 2007

1: *Argynnis paphia* ab. *confluens*, female, 7.vii.2007, Surrey, A.M. Jones. 2: *Argynnis adippe*, upperside confluent, bred heat-shock, vii.2007, K.E.J. Bailey. 3: *Polyommatus coridon* ab. *alba-ultraradiata*, Wiltshire, 24.vii.2007, M. Callow. 4: *Lysandra coridon* ab. *livida*, bred F_2, North Chilterns, A.S. Harmer. 5: *Polyommatus bellargus* gynandromorph, Purbeck, 2007, A.S. Harmer. 6: *Plebejus argus* intersex, Dorset, 2005, R. Barrington. 7: *Lycaena phlaeas* ab. *schmidtii,* temperature shock to pupa, 2007, P. Tebbutt. 8: *L. phlaeas* ab. *anticoradiata,* reared from pupa given temperature shock, 2007, A. Butler. 9: *Helix aspersa,* scalariform type, Aldershot, 2007, A. Whiteley (exhib. A.J. Halstead).

All photos are life size.
Photos by Richard A. Jones.

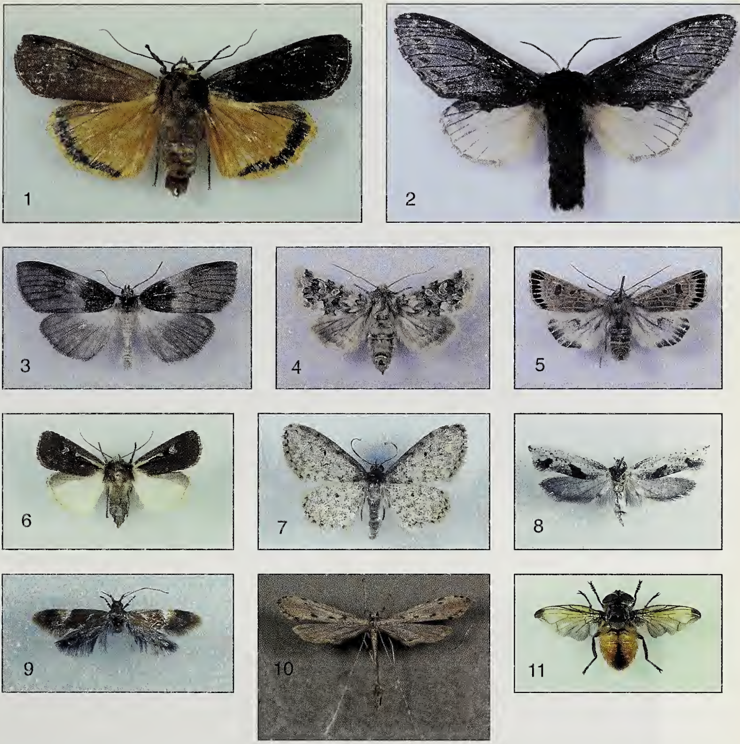

PLATE 7. ANNUAL EXHIBITION 10 NOVEMBER 2007

1: *Noctua pronuba* bilateral mosaic, Oldmeldrum, Aberdeenshire, 2.viii.2007, M. Young. 2: *Peridea anceps* ab. *nigrescens,* Blythburgh, 10.iv.2007, D.E. Wilson. 3: *Tetheella fluctuosa* unusual form, High Vinnals, Herefordshire, 12.vi.2007, J. Rush. 4: *Hadena perplexa,* Lydd-on-Sea, Kent, 5.viii.2007, S.P. Clancy. 5: *Omphaloscelis lunosa,* Dungeness, Kent, 10.x.2007, S.P. Clancy. 6: *Ochropleura plecta,* Powerstoch, Devon, 23.v.2007, J. Platts. 7: *Idaea blaesii,* Ronda, Malaga, Spain, bred, 29.vii.2007, N.M. Hall, 2 x life size. 8: *Prays peregrina,* Wimbledon, 8.ix.2007, V. Proklov. 2 x life size. 9: *Epicallima mikkolai,* Santa Roca, Mallorca, 13.x.2007, M. Honey, 2.5 x life size. 10: *Agdistis tamaricis*, La Mielle de Morville, Jersey, 22.viii.2007, ex. larva, M. Hammond, 1.5 x life size.11: *Phasia hemiptera,* male, unusual pale form, Farley Mount, Hampshire, 6.viii.2007, I. Perry.

All photos are life size, unless otherwise stated.
Photos by Richard A. Jones except 10 by Colin Hart

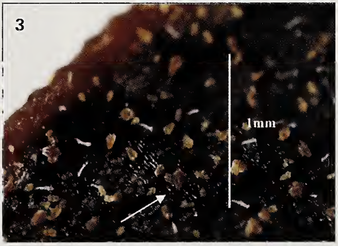

PLATE 8.

Figs. 1–3. Infestation of bay laurel by *Calepitrimerus russoi* showing (1) foliage discolouration, (2) black necrotic spotting on the lower leaf surface caused by feeding, and (3) mites on underside of a leaf – note the light brown rhomboid or kite-shaped bodies.

11.vi.2007, M. Knott det. RFMcC (second confirmed county record); *Hypochalcia ahenella* (D.&S.), Plympton Quarry, at light, 6.vi.2007, C. Plant (first Devon record for 28 years). Specimens from a holiday on The Burren, Ireland. *Pyrausta sanguinalis* (L.), Doolin Point, at dusk, 6.vi.2007, S. Hatch; *Anania funebris* (Ström), Coolorta and Fahee South, 6.vi.2007.

MITCHELL, A. – A specimen of *Dioryctria simplicella* Heinemann, typical form from Weybridge, Surrey (VC17) TQ0864, 15.vii.2007, A. Mitchell, (identity confirmed by M. Shaffer via M.R. Honey, BMNH). Also exhibited were examples of the typical form of *D. simplicella* and of f. *mutatella* Fuchs. (ex Ford collection, BMNH), for comparison.

PARSONS, M. – *Lyonetia prunifoliella* (Hübn.), Thurlbear, Somerset, 17.viii.2007, exhibited on behalf of James McGill. First British record for over 100 years.

PORTER, J. – Notable Microlepidoptera mainly from Surrey, including species added to the British and Surrey lists during 2006 and 2007; *Bucculatrix ulmifoliae* Hering, Farnham Park (VC17) SU8347/SU8447, bred from larvae on 'Sapporo' Elm, a hybrid species, 15.x.2006, 27.vi.2007; *Coleophora calycotomella* Stainton, south-west Surrey (VC17), cases collected 19.v.2007. This species was first noticed in Britain when Mr. S.J.D. Gibson found strange unidentifiable cases in April 2004 and moths have now been reared. *Dahlica triquetrella* (Hübn.), Pirbright (VC17), empty cases with exuviae, 8.iv.2007; *Lyonetia laburnella* (Stainton) f. *wailesella* Stainton, Tugley Wood (VC17) SU9833, swept from foodplant 4.viii.2007; *Argyresthia glabratella* (Zeller), Holmen's Grove (VC17) SU9236, larvae 18.ii.2007, adults emerged 20.v.2007; *Prays citri* (Milliére), Chessington (VC17) TQ1864, to light, 12.x.2006; *Prays peregrina* Agassiz, Chessington (VC17), to light 5.ix.2007; *Gelechia scotinella* H.-S., Chessington (VC17) TQ1864, to light 2.vii.2006, gen. det.; *Cochylis molliculana* Zeller, Edolph's Copse (VC17) TQ2342, to light 10.vi.2006 – subsequently recorded from six other Surrey sites that same year; *Cydia medicaginis* (Kuznetsov), Old Russia Dock, Rotherhithe (VC17) TQ3679, swept, 15.vii.2007; *Cydia pactolana* (Zeller), Tugley Wood (VC17) SU9833, tapped from spruce, 23.v.2007; *Duponchelia fovealis* Zeller, Leatherhead (VC17) TQ1655, 28.viii.2006, D.C. Gardner, and Godalming (VC17) SU9844, 29.x.2007, Ms. V.J. Searle; *Pempelia obductella* (Zeller), Chessington (VC17) TQ1864, to light, 19.vii.2006; *Dahlica inconspicuella* (Stainton), Hurt Wood (VC17) TQ0743, adult tapped from pine, 10.iv.2007; *Rhopobota myrtillana* (Humphreys & Westwood), Hurt Wood (VC17) TQ0743, netted by day, 2.vi.2007; *Pammene obscurana* (Stephens), Fairmile Common (VC17) TQ1261, to light 24.v.2007, second county record and first since 1934; *Diasemiopsis ramburialis* (Duponchel), Ockley (VC17) TQ1537, to light, 28.x.2006, W. Attridge; *Agonopterix ciliella* (Stainton), Thorney Island, West Sussex (VC13), bred, coll. 9.vi.2007, det. J.R. Langmaid.

PROKLOV, V. – *Ypsolopha ustella* (Clerck), Ashtead Common, Surrey (VC17) TQ1659, tapped from oak, 23.vii.2007, a dark-marked ochreous form not previously seen by collector. The following five species new to Surrey (VC17) in 2007: *Dahlica triquetrella* (Hübn.), Pirbright Common SU9456, empty cases with exuviae on wood fencing 8.iv.2007; *Prays peregrina* (Agassiz) (Plate 7, Fig. 8), Wimbledon TQ2670, to light, 10.vii.2007, 8.ix.2007 and 2.x.2007; *Metalampra italica* (Baldizzone), Merrow Downs TQ0449, tapped from yew, 28.vii.2007; *Cydia medicaginis* (Kuznetsov), Rotherhithe (Russia Dock Nature Park) TQ3679, swept from foodplant, 15.vii.2007; *Cydia pactolana* (Zeller), Tugley Wood, SU9833, tapped from spruce, 23.v.2007. The following are scarce in Surrey: *Lampronia morosa* (Zeller), Tugley Wood, SU9833, caught flying in sunshine, 23.v.2007, first modern Surrey record; *Altenia scriptella* (Hübn.), Farnham Park, SU8447, tapped from field maple, 12.vi.2007, first modern

Surrey record; *Acleris logiana* (Guenée), Wimbledon Common, TQ2371, on silver birch trunks, 4.iv.2007, 29.ix.2007, 5.x.2007, a strong breeding colony found; *Olethreutes arcuella* (Clerck), Sidney Wood, TQ0234, swept from bracken, 20.vi.2007, first modern Surrey record; *Epiblema cnicicolana* (Zeller), Wimbledon TQ2670, to light, 10.vi.2006, gen. det. G.A. Collins, first modern Surrey record; *Pammene gallicana* (Guenée), Milford roundabout, SU9443, swept from wild carrot, 22.vii.2007, first modern Surrey record; *Dichrorampha consortana* (Stephens), Sheepleas, TQ0852, swept from ox-eye daisy, 21.vii.2007, first modern Surrey record.

SOKOLOFF, P. – *Pammene agnotana* Rebel, Dartford Heath, Kent, 21.iv.2007, a very local and uncommon moth netted flying in sunshine amongst *Crataegus*, where the larval stage is said to feed under the bark; *Commophila aeneana* (Hübn.), High Elms Country Park, Kent, 24.v.2007, said to be local and scarce, the first record for the Orpington area, netted over chalk, rather than the heavy clay normally associated with this species; *Prays peregrina* Agassiz, Sidcup, Kent, 14.ix.2007, pair taken by David Macklin at mv light, recognised as new to science (Agassiz, 2007, *Nota lepid.*(2): 402-410).These are two of around 15 known specimens. Two more were taken close by in Orpington in 2006 by Martin Jordan. *Pempelia obductella* (Zeller), the first for the Orpington area, and seen in good numbers during early August at High Elms Country Park. Most moths taken at light around marjoram, the larval foodplant. A local and uncommon moth. One vagrant was taken at light in the exhibitor's garden in Orpington in 2005.

THIRLWELL, I.R. – *Coleophora clypeiferella* Hofmann, Portsmouth, South Hampshire (VC11), 24.viii.2007, new to Hampshire; *Monopis imella* (Hübn.), Portsmouth, South Hampshire (VC11), 14.vii.2007, a specimen with a dull orange dorsal streak; *Epiphyas* sp., Portsmouth, South Hampshire (VC11), 10.viii.2007, as yet unidentified to species.

CHANNEL ISLANDS LEPIDOPTERA

HAMMOND, M., TAILBY, K & FINCH, G. – *Agdistis tamaricis* (Zeller), "Tamarisk Plume", a plume moth new to Jersey (Plate 7, Fig. 10). Four larvae were beaten by Mark Hammond from tamarisk bushes (*Tamarix gallica*) in the early afternoon of 22.viii.2007 from the car park of the Frances Le Sueur Visitor Centre, GR WV564561, in an area known as La Mielle de Morville. The site is approximately 300m inland from a dunes and beach area on the western coast of the island. The site is relatively well stocked with *Tamarix*, which is the principal plant in a majority of the hedgerows.

Two larvae were beaten from each of two adjacent plants, but no further larvae were located despite sampling numerous bushes across a large area of the site. These larvae were unfamiliar to any of the party, and were retained for rearing through to the adult stage. Larvae were at this juncture approximately 15mm in length, one being brown the other three green.

Photographs taken by Keith Tailby were exhibited. These had been posted on the UK Moths web chat forum, and, within a very short time, it was independently suggested by Colin Hart and Martin Corley that they may be the larvae of the plume moth *Agdistis tamaricis*. Both contributors also indicated that these were new to the UK. The species is widespread with the nearest records hailing from central France and Scandinavia. A full distribution map was shown taken from www.funet.fi/pub/sci/bio/life/insecta/lepidoptera/

Web searches indicated that *tamaricis* overwinters in the larval stage in Germany, pupating in the spring, and that it has also been recorded to feed on *Myricaria germanica*, also in the family Tamaricaceae.

Three larvae pupated, 2–5.ix.2007, having attained the length of approximately 20mm, attaching themselves by the anal claspers, using a silk pad, to the foodplant or to the roof of the plastic boxes in which they had been reared. The fourth larva ceased to feed and remained motionless on the foodplant for a number of days, after which it died. There was no evidence of any parasitism.

Three adults emerged, 10-12.ix.2007. No attempt was made to breed from the adults, but they were instead photographed in vivo, set, and retained for confirmation of the initial identification. One male was subsequently submitted to Colin Hart for further photography and dissection, followed by genitalia determination. Hart later confirmed the identity as *Agdistis tamaricis* (Plate 7, Fig. 10). Upon discussion with Colin and Tony Davis of Butterfly Conservation, it was agreed to propose the English name of Tamarisk Plume for the species. A specimen will be donated to The Natural History Museum and the record therefore submitted for approval and acceptance onto the British list.

Foreign lepidoptera

Barrington, R. – An extreme melanic aberration of the fritillary *Melitaea deserticola* (Oberth.), captured by the late Donald Walker at Madeba, Jordan, 21.iv.1987. This female specimen showed heavy interneural black streaks on the upperside of all wings.

Clifton, J. – Some moths from France and Italy, autumn 2007.

Three weeks were spent in ix & x.2007 driving through France and into Italy. About 100 species were seen at Graddé, Campagnac, near Albi in the Tarn Department of France of which the following were exhibited: *Cilix glaucata* (Scop.), Chinese Character; *Luperina dumerilii* (Dup.), Dumeril's Rustic; *Pachycnemia hippocastanaria* (Hübn.), Horse Chestnut; *Leucochlaena oditis* (Geyer), Beautiful Gothic; *Nothris verbascella* (D.&S.); *Alucita zonodactyla* Zell.; *Acrobasis consociella* (Hübn.); *Lobesia botrana* (D.&S.); *Clepsis pallidata* (Hufn.); *Depressaria sordidatella* (Tengst.); *Agonopterix cnicella* (Treit.); *Hellula undalis* (Fabr.), Old World Webworm. A further 120 species were seen at La Carreta, Mozzenella, Castelnuovo di Garafagna, Tuscany, Italy, 22–29.ix.2007, of which the following were exhibited: *Episema glaucina* (Esp.); *Agrochola pistacinoides* (Aubuisson); *Aedia leucomelas* (L.), The Sorcerer; *Dysauxes punctata* (Fabr.); *Mniotype satura* (D.& S.), Beautiful Arches; *Tiliacea aurago* (D.& S.), Barred Sallow; *Tiliacea sulphurago* (D.& S.); *Cilix hispanica* (De-Gregorio), Spanish Character; *Mesotype parallelolineata* (Retz.); *Hypena lividalis* (Hübn.); *Aporophyla canescens* (Dup.); *Lemonia taraxaci* (D.&S.); *Stilbia faillae* (Pungeler); *Noctua interposita* (Hübn.); *Eublemma ostrina* (Hübn.) f *carthami*, Purple Marbled; *Ammoconia caecimacula* (D.& S.); *Cleoceris scoriacea* (Esp.); *Mesogona acetosellae* (D.&S.), Pale Stigma.

Corley, M.F.V. – (1) New and interesting Lepidoptera from Portugal. (i) Species new for Portugal in 2007: *Elachista pigerella* (H.–S.); *Aethes sanguinana* (Treit.), previously recorded in error; *Lobesia bicinctana* (Dup.); *Capperia britanniodactylus* (Gregson); *Mecyna trinalis* (D.&S.), or possibly the little known *M. andalusica* (Stdgr); *Digrammia rippertaria* (Dup.); *Aethalura punctulata* (D.&S.); *Hypena obesalis* Treit.; *Yigoga forcipula* (D.&S.); *Ocnogyna zoraida* (Grasl.), listed or mapped for Portugal by many authors, but there is no previous record. (ii) Second Portuguese records: *Depressaria libanotidella* Schläger, reared from larva on *Seseli*

tortuosum; Macaria artesiaria (D.&S.), (the previous record was over 100 years ago); *Perizoma hydrata* (Treit.). (iii) Two recently described species: *Elophila feili* Speidel, 2002, has one Spanish locality and five in Portugal; *Micropterix herminiella* Corley, 2007, which was first collected in 1880, but misidentified as *M. mansuetella* since both species have the head black-scaled. It is a Portuguese endemic with nine known localities, some very close to the Spanish border, so it will doubtless not remain a Portuguese endemic for long. (2) The genus *Cilix* in Portugal: Until recently only *C. glaucata* (Scop.) was recognised in western Europe, but the description of *C. hispanica* Perez *et al.*, 2002, and then *C. algirica* Leraut, 2006, has thrown knowledge of distributions into chaos. Old records cannot be assigned to any species until specimens are located. For example, the few records from Algarve cannot be named at present. *C. hispanica* was described from Catalonia, but is now known from southern France, and appears to be the most widespread species in Portugal, with a number of localities known in the centre and north of the country, where it occurs both in cool, wet mountainous areas and in hot dry places. It can normally be distinguished in the field by the very weak grey discal mark. Males can also be recognised by the long slender curved aedeagus which cannot be contained by the valvae, appearing as a D-shaped 'handle' beneath the tip of the abdomen. MFVC has reared larvae from *Prunus domestica* and *Crataegus*, so the larval foodplants are probably the same as those of *C. glaucata*. *C. glaucata* is only known with certainty from two mountain areas in the north of the country. Although it has the most distinct grey discal mark of the three species, there is overlap in this character with *C. algirica*. This mark is less evident in later broods. A third brood English example was exhibited to demonstrate this. *C. algirica* was overlooked by Perez *et al.* Perhaps it does not occur in Catalonia. Leraut described it from Algeria, noting that it was also present in Portugal. It is now known to occur in Spain also. In Portugal it is recorded from four hot dry localities in the centre of the country. From the genitalia and the wing markings it is much more closely allied to *C. glaucata* than *C. hispanica*. (3) *Ourapteryx sambucaria* (L.). A very local species in Portugal, known only from two mountain areas in the north. The specimens are brighter yellow than those from other parts of Europe (but MFCV has not seen Spanish material). An English specimen was shown for comparison.

HALL, N.M. – A selection of moths mostly collected in Spain, or bred from females taken in Spain, always with an authorization from the Junta of the corresponding Autonomous Region. (1) Some Spanish *Idaea*. (i) *Idaea saleri* Domínguez & Baixeras. three bred examples ex females, Cabopino, Málaga, 6 & 8.ix.2006, F_1 emerging 12.viii–30.ix.2007. These emerged much later than expected. NMH had seen the little-known *Idaea saleri* in Spain in every month from May to September (earliest 1.v.1999, latest 24.ix.2004), and had bred it from five provinces, but always as a late generation in the year of capture of the gravid female. He had never before been able to overwinter larvae to obtain adults the following year. However, larvae from females captured in Málaga province in ix.2006 were overwintered indoors in a cold part of the house, mostly in the dark and with some as late instars. NMH expected them to pupate in the early spring to produce adults about May, but they did not. They fed very slowly indeed through late spring and summer, then pupated and produced adults in viii/ix.2007 as if univoltine. All those bred were females. (ii) *Idaea blaesii* Lenz & Hausmann, one bred example ex female, Ronda, Málaga, 9.ix.2006, F_1 emerging 29.vii.2007 (Plate 7, Fig. 7). This was NMH's first encounter with *I. blaesii*. An unidentified female *Idaea* from Ronda, Málaga, was kept for eggs. NMH noticed particularly that it had 'irregular' dark spots in the fringes, which were much more conspicuous than the dashed line at the base of the

fringes. The larvae were distinctly white-spotted. All but one died, but the survivor overwintered, apparently fully-grown. It finally pupated in the following summer and the moth emerged in late July. It was identified by dissecting the parent female. Images were exhibited of (a) the parent female (set), (b) a larva on foodplant, (c) a larva imaged on glass to show the upperside pattern, (d) the freshly emerged male F_1 in resting position, (e) The F_1 set and (f) the underside of the F_1 male showing the short tarsi with first segment dilated. (iii) *Idaea alicantaria* Reisser. 4 bred examples ex females, El Pozo del Esparto, Almería, 21.iv.2007, F_1 emerging 14.viii–7.x.2007. In previous years NMH had found *alicantaria* difficult to breed, only ever obtaining two adults after their larvae had overwintered, and concluding incorrectly that it was strictly univoltine. However, in iv.2007 (earlier in the year than NMH had ever visited Spain previously), a female was captured in Almería province and the larvae fed readily with unexpectedly low mortality. 12 adults were obtained as a second generation from viii–x.2007. (iv) *Idaea ostrinaria* Hübn. f. *purpuraria*, two at mv, Istán, Malaga, 29.iv & 1.v.2007. (v) *Idaea fractilineata* Zell., five bred examples ex females, Cabopino, Málaga, 8.ix.2006, F_1 emerging 29.iv–27.vii.2007. (vi) *Idaea deitanaria* Reisser & Weisert, four bred examples ex females, El Pozo del Esparto, Almería, 19 & 21.iv.2007, F_1 emerging 27.viii–22.x.2007. (vii) *Idaea elongaria* Rambur, three bred examples ex female, Cabopino, Málaga, 4 & 6.ix.2006, F_1 emerging 20.vi–3.vii.2007. (viii) *Idaea longaria* H.–S., six bred examples ex females: Istán, Málaga, 28.iv.2007, F_1 emerging 29.vii–23.viii.2007. (ix) *Idaea attenuaria* Rambur, four bred examples ex females, Cabopino, Málaga, 27.iv.2007, F_1 emerging 17.vii–1.viii.2007 & 22.x.2007. (x) *Idaea cervantaria* Millière, two bred examples ex females, Pradales, Segovia, 2.ix.2006 & Ronda, Málaga,11.ix.2006, F_1 emerging 30.x.–5.xi.2006 & 12–31.xii.2006 respectively. (xi) *Idaea eugeniata* Millière, two bred examples ex female: Casares, Málaga, 2.v.2007, F_1 emerging 17–29.vii.2007. (xii) *Idaea aversata* L., three bred examples ex female: Istán, Málaga, 10.ix.2006, F_1 emerging 22.xi & 9.xii.2006, then 19.iv–11.vii.2007 (at least one each month). (2) Other Spanish Geometridae: (i) *Cyclophora hyponoea* Prout, one to mv and two bred examples ex female, Ronda, Málaga, 9.ix.2006, F_1 emerging 29.xi.2006 & 18.ii.2007. This *Cyclophora* can have discal cell rings on all four wings like *C. porata*. If it occurred in England as a migrant we would almost certainly misidentify it. (ii) *Myinodes interpunctaria* H.–S. four to mv, El Pozo del Esparto, Almería, 21 & 22.iv.2007. This geometrid moth is in the subfamily Desmobathrinae, none of which occur in the UK. It is said to fly mainly from late February to mid April. (iii) *Chemerina caliginearia* Rambur. four to mv, Pradales, Segovia, 16.iv.2007. This is a 'winter' moth placed in the Ennominae. In France it is said to fly from xii–iii, so NMH considered himself lucky to see fresh specimens in mid-iv in Spain. Its resting position is similar to that of the March Moth, *Alsophila aescularia* (D.&S.). The males and females had distinctly different shapes. (iv) *Enconista spodiaria* Lefèbvre at mv, Istán, Málaga, 28, 29 & 30.iv.2007. This is a moth that sits with its wings closed above its back, butterfly fashion. However the dark distal parts of the wing show through and are characteristically angled. (3) Spanish Noctuidae: (i) *Cleonymia pectinicornis* Stdgr. To mv, Puente Ventilla, Ronda, Málaga, 4.v.2007. According to Noctuidae Europaeae this species is 'local and usually rare' and 'has been found in higher numbers only in a few (mostly North African) localities'. 'The flight period is February to May.' NMH was excited to find freshly emerged moths flying in numbers at Ronda. He had previously seen only one other, also at Ronda, on 2.vi.2004. (ii) *Valeria jaspidea* Villers at mv, Pradales, Segovia, 16.iv.2007, Embalse de las Cogotas, Avila, 17.iv.2007. This attractive green noctuid only flies in iii & iv. The larva feeds on sloe and hawthorn. (iii) Confusing agrotids: *Agrotis chretieni*

Dumont & *Agrotis turatii* Standfuss. Examples from various localities in central Spain illustrating a field-identification problem. (4) 'Unspeckled' Speckled Footmen: *Coscinia cribraria* L. f. *chrysocephala* Hübn. Bred (3 male, 3 female), female Istán, Málaga, 28.iv.2007. F_1 emerging 5.ix–11.x.2007. *C. cribraria* is bivoltine in the south of Spain. Those exhibited were bred examples of the autumn generation of the yellow-headed form *chrysocephala*, with at most two small black spots on each forewing; the females often having only one. They were raised ex ova from a female caught in iv. The larvae were fed exclusively on bramble and mortality was low. Nineteen adults emerged in all, the first 11 were all males, but there were four females later. (5) Noctuidae from Costa Calma on the Isthmus of La Pared in the south of Fuerteventura: (i) A *Powellinia sp.* (undescribed), at hotel lights. The species is known from the north of Fuerteventura (Corralejo), but had not been recorded previously in the south. Though the male can be common, the female is unknown. (ii) A hadenine moth, illustrating the sort of problem that can arise when scientific names are given without author names. The specimen matched an illustration labelled *Discestra affinis* in 'Mariposas de Canarias', Báez, 1998. But NMH was not sure whether the illustration was of: (a) *Hadula deserticola* (Hampson, 1905) (L.t. Egypt, Original genus *Aglossestra* = *affinis* Rothschild, 1914 (L.t. Algeria: Guelt-es-Stel, Original genus: *Derthisa)* or (b) C*ardepia affinis* (Rothschild, 1913) (L.t. Algeria -Western Central Sahara: Kef-el-Dor, Original genus *Discestra*). NMH's specimen did not have the jizz of the *Cardepia affinis* Rothschild ssp *europaea* Hacker he had seen in Almería, so (a) i.e. *H.deserticola* seemed more likely. [This was apparently confirmed by illustrations of *Anarta (Aglossestra) deserticola* (Hampson, 1905) in Noctuidae Europapeae Vol. 9, published since the Exhibition. It does not mention its presence in the Canary Islands.] (6) *Ochropleura leucogaster* Freyer & *Ochropleura plecta* L. (including the form *unimacula* from Huesca, Vizcaya and Barcelona, in northern Spain.) (7) *Callopistria latreillei* Dup., Istán, Málaga, 3.v.2007.This species occurred in Britain for the first time in 2006. NMH drew attention to a pinkish arrowhead mark pointing towards the termen of the forewing not far below the apex. This is a constant character and is easy to spot even in poor specimens. He also made comments on the scientific name. It was named after the French entomologist, Pierre André Latreille (1762–1833), whose name was presumably pronounced La-*tray* (rhyming with Marseilles), and hence the scientific name was presumably intended to be pronounced 'La-*tray*-i'. NMH did not claim that anglicized pronunciations voicing the 'l's are 'wrong' – after all, some of the Spanish pronounce the name of the noctuid moth *Euxoa powelli* in a way that seems to rhyme with 'Clovelly', when it is presumably named after a Mr Powell. And again, hardly any British entomologist would be capable of pronouncing the name of the noctuid moth *Victrix agenjoi* as Ramón Agenjo would have done – because Spanish 'j's and soft 'g's have no equivalent sound in English. However you decide to pronounce *latreillei*, if you remember that it was named after a frenchman called Latreille you are at least likely to *spell* it correctly. (8) *Eublemma parva* (Hübn.), bred by serendipity, introduced somehow with food for *Idaea* larvae and raised unknowingly with them.

Harmer, A. S. – Aberrations of European Butterflies 2007. *Boloria pales* D.&S. A male aberration with the two rows of submarginal spots on the forewings tending to be confluent, particularly at the subapex; the two rows of submarginal spots on the hindwings were united. The black markings in the discal area of all wings were either absent or reduced. Savoie, France (asl 2429 m).

Honey, M.R. – Mallorcan moths. A small selection of the Lepidoptera that were recorded, mainly at mv light, in the Balearic Islands during two two-week visits to Mallorca in 2007, one in spring and the other in the autumn, but also including a few

specimens trapped at actinic light on the small off-shore island of Sa Dragonera. The October visit coincided with the dates of European Moth Nights, and lists were displayed showing all the species of Macrolepidoptera recorded on one of those nights from four separate locations. The exhibit showed field-pinned, double-mounted, labelled and fully identified material including several species new to the Balearic Islands. A specimen of *Epicallima mikkolai* Lvovsky, from Santa Roca, Mallorca, 13.x.2007, was photographed (Plate 7, Fig.9), because there are few illustrations of it anywhere.

KEMP, R.J. – *Proterebia afra dalmata* Godart. In Europe this species is restricted to Croatia and NW Greece and otherwise occurs in localised parts of Asia. This spring butterfly is the only species of the genus *Proterebia*, which differs from *Erebia* mainly by the presence of a pre-costal vein on the hindwing. Adults were flying in reasonable numbers (tens) in mid-April 2007 on semi-deserted allotment sites about 10 miles from the coast near Vodice in central Croatia. The larval foodplant is the common grass *Festuca ovina*. Recent Balkan wars may have helped this somewhat uncommon species.

LUCKENS, C. & HUSEY, R. – (1) Butterflies of Madeira – Endemic species and subspecies, July 2007. CL & RH spent the week 16-23.vii.2007 in Madeira staying in a pleasant hotel on the western outskirts of Funchal. On arrival it was encouraging to see *Danaus plexippus* L. floating around in the hotel gardens, and later others were seen in the centre of the city and in the botanical gardens. The exhibitors' main quest however was for the endemic butterflies, the majority of which are now confined to the Laurasilva forest on the northern slope of the mountainous spine of the island. They had been warned of the unpredictable weather in this zone – frequent dense, cool mist, preventing butterfly activity, while the coastal strip and southern slopes basked in year-round sun. They were, however, very fortunate to have brilliant weather during all their butterfly hunts and found all the endemics, with the notable exception of *Pieris brassicae wollastoni* Butler, which has not been recorded for about 20 years. The normally scarce *Gonepteryx maderensis* Felder was frequent in one area and the males made a fine show, flying around and nectaring at the deep blue flowers of roadside *Agapanthus*. The Madeiran Speckled Wood, *Pararge xiphia* Fabr. used to be common around Funchal but now seems to have retreated to the montane regions, its place in the lowlands now occupied by the recently arrived *P. aegeria* L. Both were found flying together at Ribeiro Frio and in the hills inland from Ribeira de Vaca. Another Madeiran speciality, abundant in the Paul de Serra and near Poiso, among scrubby grassland was *Hipparchia maderensis* Bethune–Baker, a dusky Grayling of the '*aristaeus*' group, which flew up in clouds from the verges of some stretches of the road. Another, more widespread, endemic was *Lycaena phlaeas phlaeoides* – again mostly encountered in the mountains. A female of *phlaeoides* was seen egg laying on *Rumex acetosella*. According to the recent book on Portugal's butterflies, 'As Borbaletas de Portugal' by E. Maravalhas, the foodplant of this butterfly is unknown. Examples of all the endemics were exhibited, including 3 examples of *Pieris brassicae wollastoni* Butler from H Allcard coll., for completeness. The remainder were all taken or bred from the week's collecting in July.

(2) *Mellicta athalia* Rott. An albinistic var. taken near Cluj–Napolca, Romania 11.v.2007.

MEREDITH, S. – An Andean satyrid butterfly, *Argyrophorus lamna* Thieme, with an altitude range of about 2500–4000 m. In viii.2007, SM and a friend Mr Adrian Hoskins joined a group of bird watchers in Peru on a journey from Cusco down through cloud forest to Atalaya where they exchanged their minibus for a boat. From there they continued by boat, staying at various lodges until they reached

Puerto Maldonaldo, from where they flew back to Cusco. The river was the Madre de Dios. While in cloud forest, at about 2500–3000 m, they reached a place on a dirt road where a stream was cascading down through scrubby vegetation, and it was very attractive to butterflies where it crossed the road. One that SM thought he recognized, was *Argyrophorus lamna* Thieme, based on identification from 'Butterflies of the Neotropical Region, Part V, Nymphalidae (Conc.) & Satyridae' by D'Abrera. He was fairly confident that he had seen this species in 1983 as he travelled by public transport across the Altiplano from Quito to Cuenca (Ecuador), but he was then always on a train or bus when he saw these apparently silver-shot butterflies - flying in barren, windswept and desolate areas. When they fly all you see is the silver but when they settle on dark soil they close their wings and 'disappear'. In D'Abrera's book (1988), a second silver butterfly is featured, *A. argenteus* Blanch. for which the altitude range is given as 900–2,300 m. As the Altiplano is roughly between 3,000 and 4,000 m, it seems unlikely that this was the species SM saw in 1983, though D'Abrera does not give an altitude range for *A.lamna,* and it seemed odd that *lamna* could fly in cloud forest at about 2,500–3,000 m and in the barren Altiplano. The Latin *lamna* seems to be a shortened version of *lammina* and means a thin sheet, foil, blade or leaf so it may refer to the silver-leaf appearance of the upperside forewings. The specimen exhibited was picked up dead by the tour guide.

PARKER, R. & JOHN, E. – Memories of Cyprus. (1) A set of specimens of all the endemic butterflies of Cyprus (3 endemic species and 6 endemic subspecies, not all currently considered valid), accompanied by a series of distribution maps portraying the development of the current Cyprus Butterfly Recording Scheme (CBRS). The butterflies on display were mainly taken during a 3-season stay on the island from May 1973 to September 1975. They were:

(i) Endemic Species: *Glaucopsyche paphos* (Chapman), The Paphos Blue; *Maniola cypricola* (Graves), The Cyprus Meadow Brown; *Hipparchia cypriensis* (Holik), The Cyprus Grayling. The status of *Glaucopsyche paphos* and *Maniola cypricola* as endemic species is unchallenged. Olivier (1993) refers to *Hipparchia cypriensis* as the subspecies *H. pellucida cypriensis*, as do Dennis *et al.* (2001), though this is perhaps not surprising as Alain Olivier is a co-author of the paper. John & Parker (2002), in their paper on the dispersal, ecology and life-history of this species accepted Kudrna's (1986) raising of *H. cypriensis* to species level, as a result of his extensive work on this genus. *H. cypriensis* is also maintained at this rank in Kudrna (2002) and Makris (2003). (ii) Endemic subspecies: *Zerynthia cerisyi cypria* (Stichel), Eastern Festoon; *Cigaritis acamas cypriaca* (Riley), Levantine Leopard; *Hipparchia syriaca cypriaca* (Stdgr), Eastern Rock Grayling (or Syrian Grayling); *Chazara briseis larnacana* (Oberth.); The Hermit; *Pseudochazara anthelea acamanthis* (Rebel), White-banded Grayling; *Hyponephele lupina cypriaca* (Riley), Oriental Meadow Brown. The status of four of these subspecies has been challenged in recent years. According to Olivier (1993), the following named subspecies are indistinguishable from, and are congeners of, valid subspecies found in countries around Cyprus. (a) *Zerynthia cerisyi cypria* referable to *Zerynthia cerisyi cerisyi*. (b) *Cigaritis acamas cypriaca* referable to *Cigaritis acamas acamas*. (c) *Pseudochazara anthelea acamanthis* referable to *Pseudochazara anthelea anthelea*. (d) *Hyponephele lupina cypriaca* referable to *Hyponephele lupina intermedia*. This analysis has crystallized with the publication of Olivier (1996), Dennis *et al.* (2001) and Wakeham–Dawson *et al.* (2003). A more comprehensive account of Cyprus endemism is to be found in John (2007).

(2) The Cyprus Butterfly Recording Scheme (CBRS). The CBRS has its roots in Parker (1983), which presented the first distribution maps for Cyprus, later to be

updated by Manil (1990), John (2000) and John (in Makris, 2003). Selected distribution maps from each were exhibited. It was in 2000, with the increasing use of email, that the idea of developing a recording scheme began to form and a dedicated website on the butterflies of Cyprus quickly followed and the resulting growth in records became exponential. Consider the Swallowtail (*Papilio machaon*) as an example of this increase in reporting. Parker recorded this in 28 10-km squares, compared with Manil's 39; by 2000, the number had increased to 58 10-km squares and to 91 by 2003. Currently, the Swallowtail is known from 112 10-km squares – a 400% increase over the 1983 coverage! The latest maps for the Swallowtail, the Paphos Blue and the Eastern Festoon were all exhibited.

Because of the low number of resident (mainly ex-pat) recorders, the scheme cannot rely on transect walks as employed by the UK Butterfly Monitoring Scheme for example. Initially, Cyprus records were plotted within 10-km UTM grids to produce maps similar to those published in 'Butterflies of Cyprus' (Makris, 2003). Since publication, the author and John set about creating maps based on a 5-km grid, while also maintaining the original 10-km map data. The absence of commercial, tourist–style maps using UTM 5-km or 10-km square grids did not help. However, the Cyprus Tourism Organisation (CTO) came to the rescue and agreed to overprint their 'Visitor's Map of Cyprus' with UTM 10-km grid squares to assist with recording. This new map, dated June 2006, is available without charge from CTO offices throughout the world – though be sure to request the version showing grids. Nowadays, sightings are usually reported within 5-km squares or to the nearest reference point (a village or landmark), to enable accurate placement of records. So the scheme remains basic, but has provided sufficient data to enable contributions to be made to The Distribution Atlas of European Butterflies (Kudrna, 2002); Butterflies of Cyprus (Makris, 2003) and Prime Butterfly Areas in Europe (van Swaay & Warren, 2003), as well as assisting with environment-related reports. Data submitted monthly by several residents is supplemented with holiday records by visitors from as far afield as Japan, America, Poland and Scandinavia, and 2007 has seen the 115th contributor to the scheme. More information about the CBRS, and much more on the butterflies of Cyprus, can be found on Eddie John's website: http://www.grayling.dircon.co.uk/index.html. Records of butterfly sightings from Cyprus would be much appreciated, and Eddie would also be happy to assist with any identifications at eddie@grayling.dircon.co.uk.

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PLANT, C. W. – Confusing Characters. A male *Cilix hispanica* De-Gregorio *et al.*, the Spanish Character, from Créon d'Armagnac, Landes, France, was exhibited alongside examples of both sexes of *Cilix glaucata* (Scop.) from Britain and Bulgaria. The exhibitor had, with others, suggested that *Cilix hispanica* may be an overlooked species amongst British *Cilix glaucata* (see Plant, Marney & Wenman, 2007, *Entomologist's Record and Journal of Variation* **119**: 194). *Cilix hispanica* was described as new to science in 2002 from Iberia and the Balearic Islands (De-Gregorio, Torruella, Miret, Casas & Figueras, 2002. *Bol. Sociedad Entomológica Aragonesa* **30**: 33–36.). It was added to the French fauna by Mazel, Ylla, & Macia, 2002. *Revue de l'Association Roussillonnaise d'Entomologie* **11**: 81–87. An examination by the exhibitor of specimens from a light trap operated by Mike and Brenda Marney at Graddé, in the Tarn Department of south-west France, found specimens collected on 12.viii.2000, 2.ix.200I, 22.viii.2007 and 14.ix.2007. These represent the first records for the Tarn and the first two pre-date the original description of the species. Dissection, by the exhibitor, of a male from Graham Wenman's trap at Créon d'Armagnac, Landes, France, in ix 2007 (the specimen exhibited) confirmed its presence in the Landes Department. Given that the moth has rested undetected amongst specimens of the Chinese Character *C. glaucata* in both Spain and France until as recently as five years ago, one is led to wonder if it may be overlooked amongst British material? Drawings of the distinctive male genitalia are presented for *hispanica, glaucata and algirica* in Leraut (2006): Moths of Europe, N. A. P. Editions, although those of *asiatica* Bang–Haas, which is currently spreading into Europe via the Balkans, are omitted. Drawings of the diagnostic features of the forewings that separate *C. asiatica* from *C. hispanica* and *C. glaucata* were also exhibited.

DIPTERA

ALEXANDER, K.N.A. – Two specimens of *Pandivirilia melaleuca* (Loew) (Therevidae), an RDB1 Windsor Forest speciality, reared from larvae found in wood mould in live hollow trees: ♀, from pear tree in a traditional orchard, Churcham, West Gloucs (SO757172), larva found 27.x.2006; ♂, from beech tree near Lamedo, Western Cantabria, Spain, larva found 20.iv.2004 [Windsor examples have all been from hollow oak trees].

BLAND, K.P. – *Phytomyza hellebori* Kaltenbach (Agromyzidae), reared from a leaf mine in *Helleborus foetidus*, Blackford, Edinburgh (NT2570, VC 83), collected 22.v.2007, emerged 5.vi.2007; the plant had been purchased from a local nursery in early May but had originated in Northants.

CHANDLER, P.J. – Examples were displayed of provisional distribution maps produced from the first 70,000 records processed by BRC (Biological Records

Centre) for the Fungus Gnat Recording Scheme, showing a range of differing distribution types. Specimens were exhibited of the two species of fungus gnat proposed as BAP (Biological Action Plan) species, i.e. *Asindulum nigrum* Latreille (Keroplatidae) (the 'Fen Flower Gnat') and *Neoempheria lineola* (Meig.) (Mycetophilidae) (the 'Giant Wood Gnat'), and of five other species as examples of those for which maps were shown.

CROSSLEY, R. – Some noteworthy flies of the North York Moors National Park [the ten species exhibited were also exhibited at the 2006 annual meeting of Dipterists Forum and details are being published in *Dipterists Digest*].

DICKSON, R.J. – Three species from South Hampshire in 2007: *Oxycera rara* (Scop.) (Stratiomyidae), Fareham (SU577070), 29/30.vii, Malaise trap, leg. K. Wheeler; *Sargus iridatus* (Scop.) (Stratiomyidae) ♀, Whitelands Wood (SU7220, VC11), 23.vi and ♀, Botley Wood (SU5409), 4.vi, Malaise trap, leg. K. Wheeler; *Thereva plebeja* (L.) (Therevidae) ♀, Whitelands Wood (SU7220, VC11), 23.vi.

HALSTEAD, A.J. – Some local or uncommon Diptera recorded in 2007: *Odontomyia argentata* (Fabr.) (Stratiomyidae) ♀ swept in meadow at Castle Acre Priory, Castle Acre, near Swaffham, Norfolk, 18.v (TF813146); *Cheilosia latifrons* (Zett.) (Syrphidae), ♂ swept at McLaren Park, near Woking, Surrey (TQ009616), 1.ix; *Leopoldius brevirostris* (Germar) (Conopidae), ♂ at mv light on riverbank wildlife area at RHS (Royal Horticultural Society) Garden, Wisley, Surrey (TQ063591), 7.viii; *Noeeta pupillata* (Fall.) (Tephritidae), ♀ swept bear Dovey Junction Station, Cardiganshire (SN696972), 14.vii; *Tephritis praecox* (Loew) (Tephritidae), ♀ 29.viii and ♂ 6.ix, swept from *Calendula officinalis* in Herb Garden at RHS Garden (TQ064581), Wisley, Surrey; *Psacadina zernyi* (Mayer) (Sciomyzidae), ♂ swept at East Walton Fen (TF735165), north-west of Swaffham, Norfolk, 19.v.

HARVEY, M.C. – Two species of Diptera new to Buckinghamshire, from Homefield Wood, Bucks (SU8186, VC 24): *Villa cingulata* (Meig.) (Bombyliidae), 25.vii, observed on a flower head in chalk grassland by Laura Fennell during a butterfly walk, a photograph was exhibited as the specimen was released at the site on the following day, although new to Bucks regularly seen about 10km east of this site in South Oxfordshire; *Leopoldius brevirostris* (Germar) (Conopidae), 22.vii, resting among low vegetation in a woodland clearing, determination confirmed by D. Clements.

HITCHCOCK, G. – In an exhibit of insects collected from Thames Gateway brownfield sites in 2007: *Dorycera graminum* (Fabr.) (Ulidiidae), swept from neutral grassland in an area of old gravel pits in W. Kent in viii.

HODGE, P.J. – *Atylotus rusticus* (L.) (Tabanidae), ♀, Cheyne Field, Ringmer, E. Sussex (TQ450126), 13.vii.2007; believed to be the first modern occurrence within the Ouse catchment, although there are recent records from the Pevensey Levels and Combe Haven, E. Sussex.

LOCKE, J.A. – A male of *Trichomyia parvula* Szabó (Psychodidae), 26.v.2007, swept at Langley Park, Bucks; the second British record of a species first recorded in Britain from rot-holes in horse chestnut *Aesculus* at Moccas Park, Herefordshire in 2002 by A. Godfrey.

PERRY, I. – A selection of uncommon Diptera found during 2007: *Tabanus glaucopis* Meig. (Tabanidae), Farley Mount, Hants, 11.viii, both sexes on parsnip *Pastinaca sativa* flowers; *Bombylius discolor* Mikan (Bombyliidae), Horton, Glamorgan, 28.iv, males holding territory in a clearing amongst gorse *Ulex europaeus* at edge of soft rock cliffs; *Callicera aurata* (Rossi) (Syrphidae), Bookham Common, Surrey, 7.vii, ♀ resting on brambles *Rubus* sp.; *Nephrocerus scutellatus* (Macq.) (Pipunculidae), Bookham Common, Surrey, 5.v, males flying low down

amongst brambles; *Chetostoma curvinerve* Rond. (Tephritidae), Bookham Common, Surrey, 19.v, ♀ on birch *Betula* leaves without any obvious food-plants nearby; *Paraclusia tigrina* (Fall.) (Clusiidae), Denny Wood, New Forest, Hants, swept from well-decayed beech *Fagus* trunk, apparently the first record for the New Forest; *Fannia ringdahlana* (Zett.) (Fanniidae) from three sites and proving to be quite widely distributed and not adverse to the wet summer of 2007: Feshiebridge, Inverness-shire, 30.vi; Center Parcs, Elveden, Suffolk, 1.viii and Hatchet Pond, New Forest, Hants, 5.viii; *Fannia tuberculata* (Zett.) (Fanniidae), Cors Caron NNR, Cardiganshire, 18.vii, swept from birch, apparently new to Wales; *Gastrolepta anthracina* (Meig.) (Tachinidae), Lode, Cambs, 8.vi, evidently expanding its range with most previous British records being from near the south coast; *Zenillia fulva* (Fall.) (Tachinidae), Farley Mount, Hants, 11.viii, ♂ on parsnip *Pastinaca sativa* flowers, apparently the first record in this country for about 40 years; *Phasia hemiptera* (Fabr.) (Tachinidae), Farley Mount, Hants, 6.viii, several unusually pale males (Plate 7, Fig. 11) – these had the abdomen largely covered with golden hairs and the black marking reduced to a narrow medial line, exhibited with a normal specimen for comparison; *Eurithia intermedia* (Zett.) (Tachinidae), from two sites in Glamorgan: Whiteford Burrows, 28.iv and Oxwich, 29.iv, at both sites found on the flowers of creeping willow *Salix repens* growing in dune slacks.

WEBB, J.A. – A display to show the technique for rearing insects from fungi: rearing is carried out by laying the collected fungi on a 3–4 cm deep layer of moist coir fibre in a tub and covering with net. Coir fibre blocks are a convenient and cheap way to buy the rearing medium; adding water in a bucket causes the fibre to swell up to three times its original size. The moist coir fibre provides a good burrowing medium for larvae which would normally pupate in the soil and prevents the fungus from drying out before the larvae complete their development [for some large boletes that tend to liquefy as the larvae mature, placing them on drier compost is necessary to remove the excess moisture, so that larvae do not drown].

Tubs are kept at room temperature and examined daily. Adults usually begin emerging within 7–14 days. The first flush is usually mycetophilids, followed by platypezids, heleomyzids, drosophilids and muscids; then sphaerocerids and phorids, sometimes also craneflies of the genus *Ula* (Pediciidae) or hoverflies of the genus *Cheilosia* (Syrphidae). Coleoptera are much slower to emerge and a three month wait is not exceptional. The rearing pots displayed contained fungi collected at the Dipterists Forum autumn field meeting in the Charnwood Forest area of Leicestershire and were mostly in the "mycetophilid" phase of emergence. Collection of fungal caps can be a good way of recording species of Diptera and Coleoptera that are rarely recorded by other methods such as sweeping; new observations can be made on the food source of particular species. Even pristine caps that apparently have no borings are worth collecting as they often have eggs already laid on them.

COLEOPTERA

ALEXANDER, K.N.A.–Some rare beetles from Britain and Northern Ireland in 2007. *Ophonus ardosiacus* (Lutshnik) (Carabidae), Cravannel Downs, Portreath, West Cornwall, SW6444, from dense flowery maritime grassland, 17.viii.2007. *Tetratoma ancora* Fabr. (Tetratomidae), Rostrevor Oakwood NNR, Co Down, J1817, 11.vii.2007, rediscovered at its sole Northern Ireland locality after a 75 year gap and Banagher Glen NNR, Co Derry, C6704, 8.vii.2007, a new county record. *Orchesia micans* (Panzer) (Melandryidae), Correl Glen NNR, Co Fermanagh, H0753, adult from old bracket of *Inonotus radiatus* on dead alder trunk, 5.vii.2007, a

second modern record. *Orchesia minor* Walker (Melandryidae), Correl Glen NNR, Co Fermanagh, H0753, 17.v.2007 and Rostrevor Oakwood NNR, Co Down, J1817, 11.vii.2007, a second and third modern record. *Stenostola dubia* (Laicharting) (Cerambycidae), Broxted, Essex, TL5824, at hawthorn blossom in woodland glade, 8.v.2007, apparently a new county record. *Cassida nebulosa* L.(Chrysomelidae), Woodcombe Point, East Prawle, South Devon, SX7936, sweeping weedy field, 30.vii.2007, apparently a new county record. *Cathormiocerus attaphilus* Brisout (Curculionidae), Hilsea Point, Noss Mayo, South Devon, SX5445, by suction sampling maritime therophyte vegetation, 24.vii.2007 and Copstone Cove, East Prawle, South Devon, SX7735, by suction sampling maritime therophyte vegetation, 31.vii.2007. *Cathormiocerus maritimus* Rye (Curculionidae), Blackstone Point, Noss Mayo, South Devon, SX5346, by suction sampling maritime therophyte vegetation, 24.vii.2007 and Copstone Cove, East Prawle, South Devon, SX7735, by suction sampling maritime therophyte vegetation, 31.vii.2007, new to South Devon, also Godrevy Head, West Cornwall, SW5843, beneath loose rocks in open rocky vegetation, 16.viii.2007 and Tubby's Head, St Agnes, West Cornwall, SW6950, beneath loose rocks in open rocky vegetation, 22.viii.2007, both new Cornish localities. *Cathormiocerus myrmecophilus* (Seidlitz) (Curculionidae), Copstone Cove, East Prawle, South Devon, SX7735, by suction sampling maritime therophyte vegetation, 31.vii.2007, westernmost record for South Devon.

ALLEN, A.J.–(1) *Lionychus quadrillum* (Duftschmid) (Carabidae), West Bay, Dorset, SY4690, one found on shingle, 9.ix.2006, this appears to be the first Dorset record since 1953. *Dromius vectensis* Rye (Carabidae), Torcross, South Devon, SX823416, one found in vegetation on rocks, 30.v.2007. *Quedius plancus* Erichson (Staphylinidae), Highland Water, New Forest, South Hampshire, several in stream-side debris, 19.iv.2006. *Acylophorus glaberrimus* (Herbst) (Staphylinidae), Highland Water, New Forest, South Hampshire, several, 19.iv.2006. *Onthophagus fracticornis* (Preyssler) (Scarabaeidae), Wavering Down, North Somerset, ST4055, several in horse dung, 21.vi.2007. *Globicornis nigripes* (Fabr.) (Dermestidae), Windsor, Berkshire, two swept from hogweed flowers, 9.v.2007. *Osphya bipunctata* (Fabr.) (Melandryidae), Wimpole Park, Cambridgeshire, TL331512, several beaten from hawthorn flowers, 3.v.2007. *Agelastica alni* (L.) (Chrysomelidae), Gatley Carrs, Stockport, Cheshire, SJ843888 several on alders, 7.x.2007, previously recorded here by Don Stenhouse in October 2005. (2) Beetles from a flight interception trap at Knighton Wood, South Wiltshire, SU0522. This has been running since the beginning of September 2006 and Michael Darby informs me that 28 of the species so far identified are new to Wiltshire as a whole with several others new to South Wiltshire (vice-county 8), including the following: *Leiodes strigipenne* Daffner (Leiodidae), several, May and June 2007; *Leiodes cinnamomea* (Panzer) (Leiodidae), one example, October 2006; *Colon dentipes* (Sahlberg) (Leiodidae), two examples, November 2006 and April 2007; *Quedius invreae* Gridelli (Staphylinidae), two examples, November 2006; *Quedius brevicornis* (Thomson) (Staphylinidae), from Buzzard's nest, October 2006; *Homoeusa acuminata* (Märkel) (Staphylinidae), one example, April 2007; *Thamiaraea hospita* (Märkel) (Staphylinidae), September 2006; *Epuraea fuscicollis* (Stephens) (Nitidulidae), October 2006; *Cryptarcha strigata* (Fabr.) (Nitidulidae), April, May, June, and September 2007; *Stephostethus alternans* (Mannerheim) (Latridiidae), several examples, April 2007; *Alphitobius diaperinus* (Panzer) (Tenebrionidae), from Buzzard's nest, October 2006; *Oncomera femorata* (Fabr.) (Oedemeridae), five in the same week, November 2006.

BOOTH, R.G.–*Atheta divisa* (Märkel) (Staphylinidae), Little Stainforth, Mid-West Yorkshire, SD816666, one female from sieving dead jackdaw at edge of grassy path,

6.viii.2006, only two other old (pre-1970) Yorkshire records are known (Denton, 2003, *The Naturalist* 128: 103-125). *Telmatophilus brevicollis* Aubé (Cryptophagidae), Haddenham, Cambridgeshire, TL460750, a pair at mv light at night from village-edge garden, 13.vii.2007. *Litargus balteatus* LeConte (Mycetophagidae), Haddenham, Cambridgeshire, TL4376, a singleton by sieving from a large heap of manure, stable sweepings and grass cuttings at side of a fenland drove road, 15.vii.2007. *Bagous lutulentus* (Gyllenhal) (Curculionidae), Bolder Mere, Surrey, TQ0758, one female sweeping water-side vegetation in warm, morning sunshine, 22.v.1992, apparently one of few Surrey records. *Drupenatus nasturtii* (Germar) (Curculionidae), Carshalton, Surrey, TQ282652, several on water-side vegetation in River Wandle, 8.vi.1986 and Beddington Sewage Farm, Surrey, TQ2966, one male in wet area, 4.v.1992, there are few Surrey records for this species. *Eubrychius velutus* (Beck) (Curculionidae), Bolder Mere, Surrey, TQ0758, amongst Myriophyllum in water, 26.iv.1998, apparently the only modern Surrey record for this species.

Booth, R.G. & Galsworthy, A.C. – A selection of captures including two species new to Britain. *Microlestes minutulus* (Goeze) (Carabidae), Laleham, Middlesex, TQ06, a female from a flight interception trap in marsh area, 2–9.vi.2007, an inland record for this rapidly spreading species. *Hypopycna rufula* (Erichson) (Staphylinidae), Laleham, Middlesex, TQ06, from a flight interception trap in marsh area, 30.ix.–14.x.2006, apparently new to Middlesex. *Ochthephilum jacquelini* (Boieldieu) (Staphylinidae), Funton Creek, Iwade, East Kent, TQ888684, sieving strandline litter, 9.iv.2007 and 25.vii.2007, a new county record. *Gyrophaena transversalis* Strand (Staphylinidae), Laleham, Middlesex, TQ06, from a flight interception trap in marsh area, 22–25.vi.2005, this is a central European species now recorded as new to Britain following its comparison with syntypic material. *Bohemiellina flavipennis* (Cameron) (Staphylinidae), Hogshaw Hill Farm, Buckinghamshire, SP7422, one from sieving old stable manure and straw, 24.vii.2006, apparently new for Buckinghamshire and one of very few UK records. *Ephistemus reitteri* Casey (Cryptophagidae), Laleham, Middlesex, TQ06, a pair from a flight interception trap in marsh area, 8–15.vii.2006, this is a southern European species which is spreading northwards and now recorded as new to Britain, best separated from the very common *E. globulus* (Paykull) by male genitalia. *Gracilia minuta* (Fabr.) (Cerambycidae), Eastchurch, Sheppey, East Kent, TQ996730, two swept from vegetation including brambles halfway down soft eroding cliffs, 25.vii.2007.

Bowdrey, J.P. – Some Coleoptera reared from galls. *Saperda populnea* (L.) (Cerambycidae), Weeley Gutteridge Wood, North Essex, TM141208, reared from gall in *Populus tremula* twig, 20.xi.2005 emerged May 2006. *Apion rubens* Stephens (Apionidae), Stannetts Creek, Stambridge, South Essex, TQ9291, reared from galled leaf of *Rumex acetosella*, 18.viii.1985 emerged September 1985. *Ischnopterapion loti* (Kirby) (Apionidae), near Blackwater Bridge, Co Kerry, Eire, reared from galled seedpod of *Lotus corniculatus*, 25.viii.2007 emerged September 2007. *Stenopterapion scutellare* (Kirby) (Apionidae), Hainault Forest, North Essex, TQ4793, reared from gall in stem of *Ulex minor*, September 2006 emerged May 2007, collected by B. Ecott, determined by J.P. Bowdrey. ?*Kalcapion semivittatum* (Gyllenhal) (Apionidae), Thorpe-le-Soken, North Essex, TM1821, emergence holes believed to be of this species in stem of *Mercurialis annua* growing on rubble in a disused gravel pit, 3.xi.2007. *Mecinus collaris* Germar (Curculionidae), near Blackwater Bridge, Co Kerry, V0806, Eire, reared from galled flower spike of *Plantago maritima*, 25.viii.2007 emerged September 2007. *Miarus campanulae* (L.) (Curculionidae), Anston Stones Wood, South-West Yorkshire, SK5383, from galled flower of

Campanula rotundifolia, 9.ix.1995. *Rhinusa antirrhini* (Paykull) (Curculionidae), Thorpe-le-Soken, North Essex, TM173225, reared from galled flower of *Linaria vulgaris*, 21.ix.2007 emerged 25.ix.2007. *Gymnetron veronicae* (Germar) (Curculionidae), Lodge Lake, Great Leighs, North Essex, TL705185, reared from galled flower of *Veronica catenata*, 31.vii.1991, collected by T. Pyner, determined by J.P. Bowdrey.

CUMING, N. St J. – Some recently found uncommon Coleoptera from coastal Suffolk. *Dyschirius angustatus* (Ahrens) (Carabidae), Minsmere, East Suffolk, TM4767, under rosettes of *Erodium cicutarium*, 10.vii.2005, first record of this species for Suffolk. *Licinus depressus* (Paykull) (Carabidae), Minsmere, East Suffolk, TM4767, under debris, 5.ix.2006 and Thorpeness, East Suffolk, TM4758, 30.ix.2007. *Cymindis axillaris* (Fabr.) (Carabidae), Thorpeness, East Suffolk, TM4758, at roots of *Echium vulgare*, 22.vi.2006 and beneath pieces of washed up Coralline Crag, 10.x.2007. *Ocypus ophthalmicus* (Scopoli) (Staphylinidae), Minsmere, East Suffolk, TM4767, on the ground, 16.viii.2006. *Ocypus fuscatus* (Gravenhorst) (Staphylinidae), Sizewell, East Suffolk, TM4765, found dead in loose sand at the base of eroding dunes, 3.x.2006, the first record for the county for at least 150 years. *Cicones undatus* Guérin-Méneville (Colydiidae), Aldringham, East Suffolk, TM4560, beneath the bark of fallen *Acer pseudoplatanus*, this constitutes only the second record for the county. *Meloe proscarabeus* L. (Meloidae), Leiston, East Suffolk, TM4362, several seen on many occasions during April 2007, this record confirms the species as breeding in the county, but also casts doubt on some earlier claims of *M. violaceus* Marsham from Suffolk; all examples were found on the front lawns that had burrows of the bee genera *Osmia* and *Anthophora*. *Chrysolina haemoptera* (L.) (Chrysomelidae), Thorpeness, East Suffolk, TM4758, at roots of *Echium vulgare*, 19.vi.2006.

DICKSON, R.J. – *Odonteus armiger* (Scopoli) (Bolboceratidae), Austin's Copse, Upham, South Hampshire, SU5221, two males and one female at mv light from area of hazel coppice with oak standards on chalk, 24.viii.2007.

DUFF, A. – *Proteinus crenulatus* Pandellé (Staphylinidae), Arnos Vale Cemetery, North Somerset, ST6071, caught in flight, 8.iii.2007, a new vice-county record. *Anotylus clypeonitens* (Pandellé) (Staphylinidae), Arnos Vale Cemetery, North Somerset, ST6071, caught in flight, 8.iii.2007, a new county record for this rare synanthropic species. *Ochthephilum jacquelini* (Boieldieu) (Staphylinidae), Titchwell RSPB Reserve, West Norfolk, TF749447, sieving tidal litter, 11.ii.2006. *Onthophagus fracticornis* (Preyssler) (Scarabaeidae), Cross, North Somerset, ST415545, 21.v.1970, collected by D.G. Brown and identification recently confirmed by D.J. Mann, a new county record, and Wavering Down, North Somerset, ST4055, from horse dung, 23.vi.2007.

FINCH, A. – *Polyphylla fullo* (L.) (Scarabaeidae), Leicester, SK54550392, a single specimen found out of doors at an industrial estate by the on-site gardener in an area where return pallets from Holland and France are stored, 11.vii.2006.

HALSTEAD, A. J. – *Trichius fasciatus* (L.) (Scarabaeidae), near Dovey Junction Station, Cardiganshire, SN696972, on hogweed flower, 14.vii.2007. *Anomala dubia* (Scopoli) (Scarabaeidae), Horsell Common, Surrey, TQ011607, on blackberry flower in sandpit, 17.vi.2007. *Agrilus viridis* (L.) (Buprestidae), Black Pond, Esher Common, Surrey, TQ128624, sweeping, 10.vi.2007. *Silis ruficollis* (Fabr.) (Cantharidae), Banc y Mwldan, Cardiganshire, sweeping boggy meadow, 16.vii.2007. *Coccinella quinquepunctata* L. (Coccinellidae), Grogwynion, Llanafan, Cardiganshire, SN694717, sweeping shingle along River Ystwyth, 15.vii.2007. *Cryptocephalus fulvus* (Goeze) (Chrysomelidae), White Down, Surrey, TQ113486, sweeping chalk downland, 28.vii.2007.

HAMMOND, P.M. & BOOTH, R.G. – *Carpophilus truncatus* Murray (Nitidulidae), near Abingdon, Berkshire, SU49, sieving hay and grain etc., 20.x.2007, a species new to Britain, collected by P.M. Hammond and identified by R. G. Booth.

HITCHCOCK, G. – *Dicheirotrichus obsoletus* (Dejean) (Carabidae), West Thurrock Marshes, South Essex, TQ586770, collected from a seasonally wet area of clinker and pulverised fly ash, 14.ix.2006.

HODGE, P.J. – Twenty-six species of Clytrinae (Chrysomelidae) collected in Continental Europe between 1998 and 2007. Only four species of Clytrinae are recorded from the British Isles and three of these are very rare or extinct. In contrast, more than 50 species occur in central and southern parts of Continental Europe. Foreign examples of three of the British species are exhibited but *Labidostomis tridentata* (L.) has not yet been found, even though it is known to be widely distributed in Continental Europe. The larvae of Clytrinae are known to be associated with ants, whereas adults are found on low vegetation or on tree foliage. The following notes give data for the specimens exhibited, together with a brief note indicating their European distribution. *Labidostomis ghilianii* (Lacordaire), 1 km E of Odeleuca, Algarve, Portugal, 37°12.176′N 8°9.482′W, 26.iv.2004 (endemic to Iberian Peninsula). *Labidostomis hordei* (Fabr.), Pereirinhas, Moncarapacho, 37°6′N 7°45′W, 9.iv.1999 and Ameijeira de Baixo, Lagos, Algarve, Portugal, 37°5.828′N 8°40.488′W, 22.iv.2001 (Iberian Peninsula). *Labidostomis humeralis* (Schneider) Col de Tende, Alpes-Maritimes, France, 44°8.438′N 7°33.906′E [Alt.1461m], 27.vi.2005 (Central Europe, excluding the Iberian Peninsula). *Labidostomis longimana* (L.), Haumont, Esparsac, Tarn-et-Garonne, France 43°55.610′N 0°58.029′E, 26.v.2004 (Europe, excluding the Iberian Peninsula). *Labidostomis lucida* (Germar), Haumont Esparsac, Tarn-et-Garonne, France, 43°55.610′N 0°58.029′E, 26.v.2004 (Central Europe, excluding the Iberian Peninsula). *Labidostomis lusitanica* (Germar), Quinta de Marim, Olhao, 37°2.028′N 7°49.148′W, 12.iv.2000 and 5 km north of Ameixial, Algarve, Portugal, 37°23′N 7°58′W, 19.iv.2000, 3 km north Marcilhac-sur-Célé, Lot, France, 44°34.914′N 1°46.207′E, 31.v.2007 (Portugal, Spain and southern France). *Labidostomis taxicornis* (Fabr.), 1 km southeast of Barâo de Sâo Joâo, Algarve, Portugal, 37°8.160′N 8°46.069′W, by R. de Almadena, 4.v.2002 (Mediterranean region from Portugal to Italy). *Lachnaia cylindrica* (Lacordaire), Sierra de Bujeo, Cadiz, Spain, 36°5.066′N 5°30.775′W [Alt. 438 m], 28.iv.2007 (Mediterranean region from Spain to Italy). *Lachnaia hirta* (Fabr.), Pereirinhas, Moncarapacho, 37°6′N 7°45′W, 9.iv.2000 and ½ km south of Javali, Algarve, Portugal, 37°14′N 7°53′W, 9.iv.2000 (Iberian peninsula and extreme south of Italy). *Lachnaia pubescens* (Dufour), Valée de Alzou, Rocamadour, Lot, France, 44°47.734′N 1°38.277′E [Alt. 140 m], 1.vi.2007 (Spain and southern France). *Lachnaia puncticollis* Chevrolat, ¼ km east of Olival, 37°12′N 8°01′W, 14.iv.1999 and 1 km south of Santa Catarina, Algarve, Portugal, 37°8.630′N 7°47.505′W, 15.iv.2005 (southern Spain and Algarve, Portugal). *Lachnaia sexpunctata* (Lacordaire), 3 km northeast of Passo del Faclallo, Liguria, Italy, 44°28.906′N 8°40.962′E [Alt. 875 m], 26.vi.2005 (Central Europe and southern France but not the Iberian peninsula). *Lachnaia tristigma* (Lacordaire), Quinta de Marim, Olhao, Algarve, Portugal, 37°2.028′N 7°49.148′W, 3/9.v.1998 (Iberian Peninsula, southern France and Sicily). *Lachnaia vicina* (Lacordaire), 1 km south of Santa Catarina, 37°8.6′N 7°47.5′W, 5.v.1998 and 1 km northwest of Junqueira, Algarve, Portugal, 37°15.975′N 7°29.110′W, 9.v.1998 (Spain and Portugal). *Tituboea biguttata* (Olivier), Pereirinhas, Moncarapacho, Algarve, Portugal, 37°06′N 7°45′W, 8.v.2006 (Mediterranean region: Iberian Peninsula, southern France, Italy, etc.). *Coptocephala scopolina* (L.), Pereirinhas, Moncarapacho, Algarve, Portugal, 37°06′N 7°45′W, 7.vii.2005 (central and southern Europe).

Coptocephala unifasciata (Scopoli), Marckolsheim, Bas-Rhin, France, 48°10.519′N 7°35.793′E [Alt. 180 m], near telecom mast, 10.vii.2002 (central and southern Europe excluding the Iberian Peninsula). *Coptocephala unicolor* (Lucas), 1 km east of Odeleuca, Algarve, Portugal, 37°12.176′N 8°9.482′W, 10.v.2003 (southern Spain and Portugal). *Clytra laeviuscula* Ratzberg, Bort, krline, (210-A1), Slovenia, 45°28.34′N 13°45.45′E [Alt. 80 m], by R. Dragonja, 11.vi.2003 (central Europe excluding the Iberian peninsula, extinct in Britain). *Clytra quadripunctata* (L.), Col de Tende, Alpes-Maritimes, France, 44°8.438′N 7°33.906′E [Alt. 1461 m], 27.vi.2005 and Lac du Tolerme, Latronquiere, Lot, France, 44°49.689′N 2°2.466′E, 4.vi.2007 (most of Europe, including Britain, scarce in Iberian Peninsula). *Chilotomina nigritarsis* (Lacordaire), Haumont Esparsac, Tarn-et-Garonne, France, 43°55.608′N 0°58.021′E, 26.v.2004 (north Iberian Peninsula and southern France). *Smaragdina affinis* (Illiger), Francoulès, Lot, France, 44°32.842′N 1°28.717′E, 22.v.2004 (central and southern Europe, no British records since 1960s). *Smaragdina aurita* (L.), Haumont Esparsac, Tarn-et-Garonne, France, 43°55.679′N 0°57.921′E, 27.v.2004 (central and southern Europe, restricted to north in Iberian Peninsula). *Smaragdina concolor* (Fabr.), Valée de Alzou, Rocamadour, Lot, France, 44°48.107′N 1°37.500′E [Alt. 140 m], 16.v.2005 (Mediterranean Europe). *Smaragdina diversipes* (Letzner), south of le Shweisetwasen, Haut-Rhin, France, 47°58.025′N 6°59.596′E [Alt. 1200 m], 11.vii.2002 (central Europe). *Smaragdina salicina* (Scopoli), Hirschauer Berg, Tubingen, Baden-Würtemberg, Germany, 48°30.363′N 8°59.514′E, 11.v.2001 (central and southern Europe, restricted to north in Iberian Peninsula).

LEVEY, B. – Some notable Coleoptera from northwest Scotland, collected in 2007, including one species new to Britain. *Bembidion virens* Gyllenhal (Carabidae), Kinlochewe River, West Ross, NH014645, numerous amongst stones over dry, coarse sand some distance from the water's edge at mouth of river, 19.vi.2007. *Cercyon alpinus* Vogt (Hydrophilidae), Kinlochewe River, West Ross, NH0263, two in sheep dung in fields close to river, 22.vi.2007. *Hydrosmecta delicatula* (Sharp) (Staphylinidae), Kinlochewe River, West Ross, NH0263, one washed out of sand and pebbles at edge of river, 15.vi.2007. *Cartodere* (s. str.) sp. (Latridiidae), Mellon Udrigle, West Ross, NG8995, images of a single female sieved from mouldy straw at edge of sand dunes, 21.vi.2007, this apparently new species is similar to *C. constricta* (Gyllenhal), also shown for comparison, and is being examined by Wolfgang Rücker, an authority on the family. *Anaspis bohemica* Schilsky (Scraptiidae), Kinlochewe, West Ross, NH024631, one male beaten from flowering broom, 15.vi.2007, this is believed to be the first record from the western highlands of this rare species, otherwise known only in Britain from Speyside and the Rannoch area. *Magdalis phlegmatica* (Herbst) (Curculionidae), Beinn Eighe NNR, West Ross, NH0064, one beaten from *Pinus sylvestris*, 18.vi.2007. *Pityogenes trepanatus* (Nördlinger) (Curculionidae), Beinn Eighe NNR, Coille na Glas-leitire, West Ross, NH0064, one beaten from conifers, 15.vi.2007.

MORRIS, M.G.–Some Anthonomini (Curculioninae, Curculionidae) from Europe. The tribe Anthonomini is a moderately speciose one with some 42 Recent genera, distributed in most zoogeographical regions of the World. The species of the Western Palaearctic were revised by Dieckmann (1968, *Beiträge zur Entomologie* **17**: 377-564), who recognised six genera. Representatives of five of these are exhibited, mostly collected recently. *Anthonomus* Germar is quite well represented in Europe, but more speciose in North America. Several species are British, with some of the rarer ones described as 'Insufficiently Known' (RDB K) by Hyman & Parsons (1992). However, the work of Dieckmann and others has clarified many of the uncertainties surrounding UK species. The species feed as larvae in buds or 'capped' flowers of

their hosts, mainly species of Rosaceae. Many are active in winter or very early in the year. *A. humeralis* (Panzer) is one of these RDB K species. The specimens exhibited are from near Kavarna, Varna Province, Bulgaria, 15.v.2007, beaten from *Prunus* sp. (probably *P. padus* L.). The species resembles the common *A. pomorum* (L.), except in size and proportions of the antennal segments. Abroad it appears to be always associated with *Prunus* spp., whereas here it has been recorded mainly from *Malus*, leading to doubts about its actual identity and status. *A. piri* Kollar is another RDB K species, although well-known as a very minor pest of apple (*Malus domestica* Borkh.) (Apple Bud Weevil). In continental Europe it is usually found on *Pyrus* spp., like these specimens, taken in abundance from near Tsarkva, 24.v.2007, and near Krypen, 26.v.2007, Varna Province, Bulgaria. They show considerable variation in size. *A. rufus* Gyllenhal is a RDB3 (Rare) species in Britain, though probably commoner that records suggest. It is associated with *Prunus spinosa* L. The specimens shown are from the Causse Méjean, Lozère, France, 15.iv.2006. *A. stierlini* Desbrochers (not British) is also associated with species of *Pyrus*. The weevils exhibited, which were beaten from *Pyrus* sp., are from near Kedares, Cyprus, 20/23.iv.2002. *A. ulmi* (De Geer) is only classified as Notable B in Great Britain, but examination of museum specimens shows that in some cases the much commoner *A. bituberculatus* Thomson is doing duty for it. The species is associated with *Ulmus* spp. and has undoubtedly declined because of the ravages of Dutch Elm Disease. The specimens shown are from near Tsarkva, Varna Province, Bulgaria, 27.v.2007, beaten from *Ulmus* sp. *A. baudueri* Desbrochers is placed in subgenus *Persexarthrus* Voss, whereas all the preceding species are in *Anthonomus* s. str. The specimens exhibited were beaten from *Prunus persica* (L.) Batsch near Kathikas, Cyprus, 21.iv.2002. *A. varians* (Paykull) is also placed in a separate subgenus, *Anthomorphus* Weise. It is a British species associated with *Pinus sylvestris* L., larvae feeding in male inflorescences. Here it is known only from Scotland. Its apparent failure to spread into England is surprising as the species is found abundantly in southern Europe. These examples are from Les Cortals, Pyrénées-Orientales, France, 15.vii.2003. *Furcipus* Desbrochers is sometimes treated as a subgenus of *Anthonomus*; it is monotypic. Larvae feed in fruits, in contrast to the bud/flower feeding habit of *Anthonomus* spp.. *F. rectirostris* (L.) is a relatively recent addition to the British list. It is associated especially with *Prunus padus* and so is absent from southeastern England, where this host does not occur. Abroad it has a wider range of *Prunus* hosts. The specimens exhibited were beaten from *Prunus* sp., near Radull, Sofia Province, Bulgaria, 10.vi.2006. *Brachonyx* Schönherr is a genus distinct from *Anthonomus*, though related to *Macrobrachonyx*, and is also monotypic, larvae feed in needle-pairs of *Pinus sylvestris*, *B. pineti* (Paykull) is a British species. Unlike *Anthonomus varians* it occurs, though sporadically, in southern England as well as Scotland. The weevils exhibited are from near Borovets, Sofia Province, Bulgaria, 10.vi.2006, and the Causse Méjean, Lozère, France, 15.iv.2006. *Macrobrachonyx* Pic is a monotypic genus endemic to the Canary Islands. Dieckmann (1968) wrote at length on the phylogeny of the single included species and its relation to its 'sister-species' *Brachonyx pineti*. *M. gounellei* Pic is associated with *Pinus* spp. (like *B. pineti*), but the biology has not been studied in detail. The specimens shown were beaten from *Pinus canariensis* Chr. Sm. ex DC. at Montaña Roja, Tenerife, 21.ii.1998 and Montaña Tagoja, La Palma, 27.ii.1998. The species evidently eluded Thomas Vernon Wollaston (1822-78), who did so much early work on the beetle fauna of the Canaries. *Bradybatus* Germar is a Palaearctic genus with no British representatives, but several occur in western Europe. All are associated with *Acer* spp. and are most often found when their hosts are in flower (usually in April). The larvae of those

species whose biology is known feed in fruits of their hosts. *B. kellneri* Bach is widespread in western Europe, where it feeds on a variety of *Acer* spp. The specimens exhibited were taken on Mt. Aurelien, Var, France, from an *Acer* in flower on 18.iv.2006. *B. seriesetosus* Petri is more eastern in its distribution, although it occurs rarely in eastern France. The weevils shown were taken from an exceptionally abundant colony near Tsarkva, Varna Province, Bulgaria, 27.v.2007 from a species of *Acer* tentatively identified as *A. campestre*. *Bradybatus elongatulus* (Boheman) is placed in the subgenus *Nothops* Marseul (the other species shown are in *Bradybatus* s. str.). These examples occurred with *B. kellneri* at Mt. Aurelien, Var, France, on 18.iv.2006.

ORAM, D. – Some Coleoptera from Umbria, Italy, mostly caught near Umbertide about 40 km north of Perugia at around 500 m above sea level in open mixed woodland, 1–15.vii.2007. *Oryctes nasicornis* (L.), *Oxythyrea funesta* (Poda), *Protaetia* (*Netocia*) *morio* (Fabr.), *Cetonia aurata pisana* Heer (Scarabaeidae); *Capnodis tenebrionis* (L.), *Acmaeodera degener* (Scopoli) (Buprestidae); *Trichodes leucopsideus* (Olivier) (Cleridae); *Coccinella septempunctata* L., *Coccinula quattuordecimpustulata* (L.) (Coccinellidae); *Stenurella bifasciata* (Müller), *Purpuricenus kaehleri* (L.), *Chlorophorus trifasciatus* (Fabr.), *Morimus asper asper* (Sulzer), *Agapanthia dahli* (Richter) (Cerambycidae); also unidentified species of Melyridae, Tenebrionidae, Oedemeridae, and Meloidae.

TELFER, M.G. – *Pterostichus aterrimus* (Herbst) (Carabidae), Kilroosky Lough ASSI, Co. Fermanagh, H493275, at a marl lake, 20.vi.2007, a known site for this beetle now presumed extinct in Great Britain. *Licinus depressus* (Paykull) (Carabidae), Easington Colliery, Busiers Holes, Durham, NZ444438, running on path, 12.vii.2007. *Haliplus mucronatus* Stephens (Haliplidae), Sundon Quarry SSSI, Bedfordshire, TL0427, in disused chalk quarry, 28.viii.2007. *Bledius erraticus* Erichson (Staphylinidae), Portstewart Dunes, Bann Estuary ASSI, Co. Londonderry, C7936, one only found, 27.iv.2007. *Bledius subniger* Schneider (Staphylinidae), Portstewart Dunes, Bann Estuary ASSI, Co. Londonderry, C7935, 27.iv.2007, new for Northern Ireland with records this year from Cos. Down, Antrim and Londonderry. *Aleochara cuniculorum* Kraatz (Staphylinidae), Weybourne cliffs, East Norfolk, TG10054386, at night at arm's length down rabbit burrow, 24.viii.2006, second record for Norfolk. *Odonteus armiger* (Scopoli) (Bolboceratidae), near Aldbury, Hertfordshire, SP959116, two females captured at mv light by Martin Harvey, 15.vii.2007. *Cantharis fusca* L. (Cantharidae), South Gorley, South Hampshire, SU167108, one found, 9.vi.2007. *Rhizophagus nitidulus* (Fabr.) (Rhizophagidae), Langley Park, Buckinghamshire, TQ08, one off *Piptoporus betulinus* on silver birch, 26.v.2007. *Micrambe lindbergorum* (Bruce) (Cryptophagidae), Cross Gill, Blackhall Rocks, Durham, NZ475382, ten swept from calcareous cliff-slope grassland together with two *M. vini*, 12.vii.2007. *Sericoderus brevicornis* Matthews (Corylophidae), South Gorley, South Hampshire, SU167108, one female (det. Stan Bowestead) in an emergence trap, 6-13.vi.2006, another record of this recent addition to the British fauna. *Lycoperdina bovistae* (Fabr.) (Endomychidae), Langley Park, Buckinghamshire, TQ08, three in puffball *Lycoperdon* sp., 20.i.2007. *Abdera quadrifasciata* (Curtis) (Melandryidae), Langley Park, Buckinghamshire, TQ08, several from beech branch, collected 20.i.2007, emerged during summer. *Mesosa nebulosa* (Fabr.) (Cerambycidae), Langley Park, Buckinghamshire, TQ08, from beech branch, collected 20.i.2007, emerged by 15.iv.2007. *Bruchidius varius* (Olivier) (Bruchidae), Trimingham cliffs, East Norfolk, TG2739, two females, 15.vi.2006 and two further females, 21.viii.2006, first records for Norfolk. *Spermophagus sericeus* (Geoffroy in Fourcroy) (Bruchidae), Sandy, Bedfordshire, TL188478, found by Dave Redding tucked in at base of stalk of an

apple imported from France, 29.xi.2004, although a specimen was found by J. R. Dibb 'by shaking leaves from a hedge bottom at Blackmoor, near Shadwell, Leeds, in April 1924' (Donisthorpe, H. (1931) Ent. Rec., **43**, 33–34) this species has not been included on the British list. *Chrysolina marginata* (L.) (Chrysomelidae), Frickley Colliery, South West Yorkshire, SE4609, 5.vi.2007, there are five previous Yorkshire records, four pre-1920 and one from Askrigg in 1978. *Gonioctena decemnotata* (Marsham) (Chrysomelidae), Langley Park, Buckinghamshire, TQ08, discovered by Ivan Wright on aspens, 26.v.2007. *Pseudoprotapion astragali* (Paykull) (Apionidae), Sundon Quarry SSSI, Bedfordshire, TL0427, off wild liquorice in disused chalk quarry, 28.viii.2007, already known from this site. *Polydrusus pulchellus* Stephens (Curculionidae), Murlough ASSI, Blackstaff Estuary, Co. Down, J42253936, one found, 25.iv.2007, first record for Northern Ireland. *Cossonus linearis* (Fabr.) (Curculionidae), Langley Park, Buckinghamshire, TQ08, in aerial interception (vane) trap, 21–26.v.2007. *Rhinusa linariae* (Panzer) (Curculionidae), Frickley Colliery, South West Yorkshire, SE4609, amongst common toadflax *Linaria vulgaris*, 5.vi.2007, probably the first record for the vice-county.

HEMIPTERA

ALEXANDER, K.N.A. – Three nationally scarce bugs from Cornwall and Devon. *Physatocheila smreczynskii* China (Tingidae) Forest Cottage Orchard, Ashclyst Forest, S. Devon (SY0099), beaten from apple branch, 5.vi.2007; *Globiceps fulvicollis cruciatus* Jakovlev (Miridae) new to Cornwall; Chapel Porth, W. Cornwall (SW6949), swept from humid heath, 22.viii.2007; *Strongylocoris luridus* (Fallén) (Miridae) from West Penwith, a new area for this Lizard speciality: Bosigran Cliff, Zennor (SW4136), 8.viii.2007.

BOWDREY, J.P. – *Aphanus rolandri* (L.) (Lygaeidae) Notable A, on surface of a pond near Thorrington, Essex, TM0821, 25.iv.2007, the first recent county record and new to North Essex (VC 19); *Megalonotus praetextatus* (H.-S.) (Lygaeidae), Arlesford, North Essex, TM0619, 23.v.2007, under *Erodium* rosette, Notable B.

BROOKE, S. – Distribution maps of four examples of water bug species that are well distributed and often common in southern Britain and have now reached Yorkshire, with a plea for new records from northern locations: *Gerris argentatus* Schummel (Gerridae), usually found amongst emergent vegetation; *Cymatia coleoptrata* (Fabr.) (Corixidae), recently reached northwards to Durham and westwards to Hereford & Denbigh, found in well vegetated ponds and ditches; *Ilyocoris cimicoides* (L.) (Naucoridae), found in mid-west Yorkshire, usually present in dense vegetation in silty or muddy ponds; *Plea minutissima* Leach (Pleidae), has reached Kirkcudbrightshire, Cumbria and the Isle of Man, lives amongst dense weeds in clear water.

HALSTEAD, A.J. – *Alydus calcaratus* (L.) (Alydidae), Sheets Heath Common, nr Brookwood, Surrey, SU946574, swept from heather, 25.viii.2007; *Coranus subapterus* (De Geer) (Reduviidae), Sand Pit, Horsell Common, nr Woking, Surrey, TQ011607, 15.ix.2007, swept from heather.

NAU, B.S. – Exhibit of four species of red-and-black Heteroptera that are spreading in Britain: *Corizus hyoscyami* (L.) (Rhopalidae), Samphire Hoe, East Kent, VC15, 1998, long-time resident of coastal sand-dunes on south and west coasts of England and Wales, spreading in recent years, now reaching south Midlands; *Arocatus roeselii* (Schilling) (Lygaeidae), Holborn, Middlesex, VC 21, 2007, first recorded in central London in 2006 and already building up large populations across the city on its host plant, plane trees (*Platanus* spp.); *Pyrrhocoris apterus* (L.)

(Pyrrhocoridae) (firebug), large colony found in 2007 near Sandy, Bedfordshire (VC 30), probably imported from Portugal on *Eucalyptus* wood used to make boxes for horticultural produce, the only other permanent populations in Britain are on an island off S. Devon (known since 1865) and Epsom (since 1996); *Eurydema ornata* (L.) (Pentatomidae), Southbourne, South Hampshire (VC 11), 2005, coll. A. Collins, found since 2004 at several south coast sites from Dorset to Sussex and breeding in small numbers.

Hymenoptera

Harvey, M.C. – Hymenoptera from Buckinghamshire. *Gorytes laticinctus* (Lepeletier). This was seen investigating the soil of a plant pot in a garden in Great Kimble, Bucks on 3.viii.2007. A Red Data Book species that appears to be expanding its range at present.

Halstead, A. – Some local or uncommon sawflies taken in 2007. Tenthredinidae: *Dolerus anticus* (Klug), 20.v.2007, Thompson Common, Norfolk, TL935966, swept; *Dolerus bimaculatus*, (Geoffroy), 19.v.2007, East Walton Fen, Norfolk, TF735165, swept. Xiphydriidae: *Xiphydria camelus* (L.). 4.viii.2007, Sand Pit, Horsell Common, Surrey, TQ011607, swept. A dwarf female specimen, 8.5mm long including ovipositor, exhibited alongside a typical female specimen (usually 14-19mm) for comparison.

Hawkins, R.D. – Hymenoptera from Surrey in 2007. Diprionidae: *Gilpinia virens* (Klug), 10.vii.2007, male reared from larva on scots pine, Stanners Hill, Chobham, TQ001633; 28.vii.2007, Queenwood Farm golf course, Ottershaw, TQ012640, male reared from larva on young Corsican pine. Mutillidae: *Mutilla europaea* L., 19.vi.2007, Chertsey Meads, TQ058662, male on hogweed flowers. Andrenidae: *Andrena fulvago* (Christ), 22.v.2007, Stoke Park, Guildford, TQ001506, female at flower of beaked hawksbeard.

Hitchcock, G. – Hymenoptera collected from Thames Gateway brownfield sites in 2006 and 2007. Pompilidae: *Auplopus carbonarius* (Scopoli), August 2007, North Kent. Eumenidae: *Odynerus melanocephalus* (Gmelin), June 2007, West Kent. Anthophoridae: *Nomada fucata* Panzer, April 2007, West Kent. Colletidae: *Colletes halophilus* Verhoeff, August 2007, foraging on wall rocket (*Diplotaxis* sp.). Halictidae: *Lasioglossum xanthopus* (Kirby), October 2006, male collected at knapweed. Apidae: *Bombus humilis* Illiger, August 2007, North Kent, collected from Compositae; *Bombus sylvarum* (L.), August 2007, foraging at black horehound *Ballota nigra* (L.).

Wheeler, K.J. – A selection of aculeate Hymenoptera from Botley Wood in Hampshire (v.c.11). Chrysididae: *Chrysis ignita* (L.), 2.vi.2006, SU5409, Malaise trap; *Chrysis illigeri* (Wesmael), 28.vi.2006, SU5409; *Hedychridium roseum* (Rossius), 28.vi.2006, SU5409. Eumenidae: *Gymnomerus laevipes* (Shuckard), 18.v.2006, SU5409. Sphecidae: *Astata boops* (Schrank), 29.v.2006, SU5409, Malaise trap; *Gorytes laticinctus* (Lepeletier), 19.vii.2006, SU5409, Malaise trap; *Philanthus triangulum* (Fabr.), 6.vii.2006, SU5410.

Other orders

Neuroptera

Plant, C.W. & Harvey, M.C. – A lacewing new to the British Isles. Chrysopidae: *Nineta pallida* (Schneider), 23.ix.2006, Wendover Woods, Buckinghamshire, SP889088, at light. A specimen of this large green lacewing was taken during a

moth recording evening and identified as *N. pallida*. This species is a very localised European species associated with Spruce (*Picea* sp.) Wendover Woods is a Forestry Commission woodland which includes some 40 hectares of spruce plantation.

Psocoptera

Alexander, K.N.A. – Two exhibits to celebrate the launch of the National Barkfly Recording Scheme. (1) – A newspaper clipping from the Western Morning News of 9th November 2007 reporting the arrival in Cornwall of *Atlantopsocus adustus* (Hagen) (Psocoptera: Psocidae), a species previously only known from Madeira and the Canary Islands. (2) – Extracts from the new Barkfly Recording Scheme website hosted by the Biological Records Centre at http://www.brc.ac.uk/hostedSchemes.htm

General

Haines, C.P. – A display of new and old Royal Entomological Society Handbooks for the Identification of British Insects, including the recently published 'Carabidae (ground beetles) of Britain and Ireland' by Martin Luff. The next book in the series was expected to be a key to British Lonchaeidae by Iain MacGowan and Graham Rotheray (published 2008). Also information and posters about National Insect Week 2008, due to take place 23–29 June 2008.

Halstead, A.J. – A live specimen of the common snail, *Helix aspersa* Müller collected by A. Whiteley from Aldershot during the previous week, with an unusual elongate 'scalariform' shell (Plate 6, Fig. 9).

Hitchcock, G. – A display giving an update on Buglife's work conserving brownfield invertebrates in the Thames Gateway, near London. Over a quarter of the sites in the Thames Gateway have been assessed as having a high invertebrate biodiversity potential. A list of UK BAP species from the region was included. Also shown was a new Buglife poster illustrating brownfield invertebrates aimed at increasing the public's awareness of the importance of conserving these man-made, often derelict habitats.

Simpson, M. – An exhibit showing the many talents of T.G. (Graham) Howarth and his contributions to the science of entomology. The exhibit consisted of examples of his entomological artwork skills: from the ages of 15 and 19, drawings completed whilst a Japanese prisoner of war during the period 1942-1945, firstly in Changi prison camp, Singapore followed by a lengthy period in Jinsen prison camp, Korea. Also displayed were details of Graham's life history, bibliography and the taxa he has described. Graham Howarth is perhaps best known for his revision of Richard South's classic work on the British butterflies. It is probably no coincidence that the first book on butterflies owned by Graham was South's *The Butterflies of the British Isles* (1906). This book, given to him by his grandfather, was on display. Photographs charting his entomological career were included. Graham presented his Presidential Address to the Society in 1952 and a plate showing unusual variations of the fritillary *Euphydryas cynthia* (D.&S.) not illustrated in his address at the time may be found in a recent issue of the journal *BJENH* **17:** 101–102.

INSECTS OF MORTIMER FOREST ON THE SHROPSHIRE/ HEREFORDSHIRE BORDER

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Abstract

A visit was made to Mortimer Forest (Shropshire/Herefordshire) during May 2007 to collect insects for the collections of the Natural History Museum. One hundred and ninety-six species are listed including 12 species with conservation status, indicating some promising ancient woodland habitats, particularly along the Mary Knoll Valley. Particular highlights include the parasitic wasp *Platystasius transversus* (Thomson), new to Britain, the parasitic wasp *Monelata aphrodite* (Nixon), second British record, a new site for the RDB2 longhorn beetle *Pyrrhidium sanguineum* (L.) and a thriving population of the priority BAP moth, the Drab Looper, *Minoa murinata* (Scopoli).

Introduction

A visit was made to the Mary Knoll Valley area during 21–24 May 2007 to collect parasitic wasps and other insects for the collections of the Natural History Museum. Mary Knoll Valley is a part of Mortimer Forest on the Shropshire/Herefordshire border, which is currently managed by the Forestry Commission. According to the Forestry Commission website (*http://www.forestry.gov.uk*) Mortimer Forest is a remnant of the ancient Saxon hunting forests of Mocktree, Deerfold and Bringewood. The area has been strongly influenced by the proximity of Ludlow, since it would have provided the firewood and other wood products for the inhabitants of Ludlow Castle and town. The landscape of the current Mortimer Forest is dominated by limestone ridges and recent conifer plantations, although some significant areas of broadleaf woodland remain, particularly along the steep-sided and picturesque Mary Knoll Valley. Collecting was undertaken in the area of the valley managed by the Forestry Commission, and focused on areas with broadleaf trees, especially those areas which appeared to have had some historical continuity of woodland. More details of the precise collecting localities are given below.

Site descriptions and key to locality codes used in the list of records.

(1) *Herefordshire, Mary Knoll Valley, SO4873, stream/ancient wood/conifer plantation.* Collecting in this area focused on native broadleaved woodland, especially the area immediately adjacent to the stream, which appeared to have the character of ancient managed woodland, as judged from the ground flora, old coppice, and old bank and ditch systems. The following nectar plants were flowering: ramsons, some wood spurge and occasional hawthorn. There was a significant amount of dead wood. A track leading down the north valley side had significant areas of bare earth and south-facing earth banks for thermophile species e.g. tiger beetles and nest sites for aculeate Hymenoptera.

(2) *Herefordshire, Mary Knoll Valley, SO4972, stream/ancient wood/conifer plantation.* Collecting in this area focused on native broadleaved woodland, especially the area immediately adjacent to the stream, which appeared to have the character of ancient woodland, as judged from the ground flora, old coppice, a large

pollard lime, *Tilia* sp., and old bank and ditch systems. The following nectar plants were flowering: ramsons and some hawthorn. There was some dead wood. No collecting was done on the south-west side of the valley in the direction of Haye Park Wood or Overton Common.

(3) *Herefordshire, Mary Knoll Valley, SO4973, conifer plantation.* Limited collecting was made along the rides in areas where there was varied ground flora.

(4) *Shropshire, Whitcliffe, SO496738, old oak coppice, grown to standards.* Collecting focused on a small area of oak standards, apparently grown up from old coppice stools, with larger oaks, along an old bank and ditch system on one margin. The site appears to have had some continuity of oak woodland/trees on this site. There were some piles of dead wood, however the ground flora was fairly limited due to shading, and possibly deer grazing as well. This site is near to but distinct from Whitcliffe Common which also has many fine mature trees.

Methods

Collections were made using sweep netting, hand netting and hand collection. Species identified are listed below following standard identification works and checklists. Determinations were made by D. Notton, except for Ichneumonidae and Pompilidae which were determined by Dr Gavin Broad, Platygastridae (*Amblyaspis, Leptacis, Platygaster* and *Synopeas*) which were determined by Peter N. Buhl and Coleoptera which were determined by Max Barclay, David Notton and Pavel Průdek. Locality number codes follow the list above. Conservation status listings are taken from *www.jncc.gov.uk/page-3409*. Selected Hymenoptera, Coleoptera, Diptera, Hemiptera, Orthoptera, Raphidioptera were kept as vouchers by the Natural History Museum and registered under number BMNH(E)2007-39. No Lepidoptera, Odonata or non-insects were retained.

Results & Discussion

One hundred and ninety-six insect species were recorded including 12 species with conservation status listings and two very rare parasitic wasps for which there are currently no status listings (Table 1). The full list of species is given in the Appendix. Most of these species are dependent on, or associated with, dead wood and/or mature broadleaf trees, or plants found in old broadleaf woodland. Particular highlights include the parasitic wasps *Platystasius transversus* (Thomson) (Platygastridae) and *Monelata aphrodite* (Nixon) (Diapriidae), the longhorn beetle *Pyrrhidium sanguineum* (L.) (Cerambycidae) and the moth *Minoa murinata* (Scopoli) (Geometridae) (Plate 5, Fig. 9).

Platystasius transversus is previously recorded only from continental Europe and Ireland (Thomson, 1859; Sundholm, 1956; Nixon, 1937). This species is recorded here as new to Britain. More details on this and two other previously unpublished British records will be published elsewhere as part of a checklist of British Platygastridae (Buhl & Notton, in prep.). Nixon (1937) recorded this species as developing in the eggs of the longhorn beetle *Leptura aurulenta* (Fabr.), which are laid in bark, although this host was not recorded at the Mary Knoll Valley, a wide range of other cerambycids were present, so possibly other host species can be attacked.

Monelata aphrodite is very rare in the UK having only been described in 1980, I have been unable to trace any other published British records apart from that of the type material from one locality in London (Nixon, 1980). No host records are

Table 1. Insect species of conservation status recorded from Mortimer Forest, 2007

Order	Family	Species	Status
Coleoptera	Cerambycidae	*Poecilium alni*	Nationally notable B
	Cerambycidae	*Pyrrhidium sanguineum*	RDB: Vulnerable
	Lymexylidae	*Hylecoetus dermestoides*	Nationally notable B
	Monotomidae	*Rhizophagus picipes*	Nationally notable A
	Pyrochroidae	*Pyrochroa coccinea*	Nationally notable B
	Scolytidae	*Xyleborus dispar*	Nationally notable B
Diptera	Asilidae	*Dioctria oelandica*	RDB: Nationally notable
	Tipulidae	*Tanyptera nigricornis*	RDB: Rare
Hymenoptera	Formicidae	*Lasius brunneus*	Nationally notable A
	Tiphiidae	*Tiphia minuta*	Nationally notable B
	Diapriidae	*Monelata aphrodite*	2nd British record (No conservation status listing available)
	Platygastridae	*Platystasius transversus*	New to Britain (No conservation status available)
	Pompilidae	*Priocnemis coriacea*	Nationally notable A
Lepidoptera	Geometridae	*Minoa murinata* (Drab looper)	Nationally notable B; UK BAP Priority Species

known, although this species is probably an endoparasitoid in the puparia of cyclorrhaphan Diptera as are related diapriids.

Pyrrhidium sanguineum is an RDB2 longhorn beetle. Reference to Twinn & Harding (1999) shows that this species is restricted to central Wales and the adjacent areas of England, although it was formerly more widespread at scattered locations across England. It is associated with ancient broad-leaf and pasture woodland and particularly oak, *Quercus* spp. It is not previously recorded anywhere in the 10 km square SO47 according to Twinn & Harding (1999) and the NBN Gateway website (*www.searchnbn.net/*).

Minoa murinata (Drab Looper moth) is a nationally Notable B and UK priority Biodiversity Action Plan species (*www.ukbap.org.uk*) feeding on wood spurge *Euphorbia amygdaloides* L. (Plate 5, Fig. 9). The food plant is particularly common in Mortimer forest with good flowering stands along the rides and recently felled areas where the day-flying adults of this moth can be seen nectaring. The Mortimer Forest population forms a part of one of its two British centres of distribution, which extends from Gloucestershire and Monmouthshire northwards through Herefordshire and Worcestershire. Since the larvae feed on wood spurge, preferring the flowers and floral parts of plants growing in full sun, the maintenance of rotational coppicing or felling should assist its survival. Neither Harper & Simpson (2002) nor Riley (1991) record this species from 10km square SO47: Harper & Simpson note that in the Watsonian vice-counties of Herefordshire and Worcestershire the moth is locally fairly common in open woodland containing wood spurge though it has possibly declined in some areas due to lack of coppicing. Riley records its occurrence in Shropshire from the Wyre Forest, Shrewsbury and Munslow, although other sites may now be known from recent research/survey work associated with the BAP for this species.

Generally, although the sample is limited to one brief visit, there are indications of some promising ancient woodland habitats, particularly along the Mary Knoll Valley, but also the old oak coppice on Whitcliffe, both of which deserve further investigation.

Acknowledgements

Thanks are due to the Forestry Commission for permission to collect on their land, and especially to Ranger Alan Reid; Max Barclay (Natural History Museum, London) and Pavel Prùdek for identifications of Coleoptera; Gavin Broad (Natural History Museum, London) for identifications of Ichneumonidae and Pompilidae; Peter N. Buhl (Zoological Museum, University of Copenhagen) for identification of Platygastridae; National Biodiversity Network and Rachel Price, Herefordshire BRC. The photograph of *M. murinata* was kindly supplied by Dave Green (Butterfly Conservation).

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Appendix

LIST OF RECORDS FOR MORTIMER FOREST, 2007

(for key to locality codes see above)

COLEOPTERA

Anobiidae: *Dryophilus pusillus* (Gyllenhal) (1); *Ptilinus pectinicornis* (L.) (1). ***Apionidae:*** *Perapion violaceum* (Kirby) (1, 2, 4). ***Byrrhidae:*** *Cytilus sericeus* (Forster) (1). ***Byturidae:*** *Byturus tomentosus* (De Geer) (1, 2). ***Cantharidae:*** *Cantharis cryptica* Ashe (1); *C. decipiens* Baudi (1, 2); *C. nigra* (De Geer) (1); *C. nigricans* (Müller) (1); *C. pellucida* F. (2); *Malthodes pumilus* (Brébisson) (2); *Rhagonycha lignosa* (Müller) (1, 2); *Rhagonycha testacea* (L.) (2). ***Carabidae:*** *Abax parallelepipedus* (Piller & Mitterpacher) (1); *Asaphidion curtum* (Heyden) (1); *Cicindela campestris* L. (1). Common along sunny parts of path on steep slope and bare earth banks by path; *Notiophilus biguttatus* (Fabr.) (1); *Poecilus cupreus* (L.) (1); *Pterostichus madidus* (Fabr.) (1); *P. strenuus* (Panzer) (1). ***Cerambycidae:*** *Alosterna tabacicolor* (De Geer) (1); *Clytus arietis* (L.) (2); *Grammoptera ruficornis* (Fabr.) (1); *Leiopus nebulosus* (L.) (1); *Pachytodes cerambyciformis* (Schrank) (1, 2). Common, at flowers of *Euphorbia amygdaloides*; *Poecilium alni* (L.) (1). ***Nationally notable B;*** *Pogonocherus hispidulus* (Piller & Mitterpacher) (1); *Pyrrhidium sanguineum* (L.) (4), one imago, ***RDB: Vulnerable;*** *Rhagium bifasciatum* Fabr. (1). Common on hawthorn blossom; *Rhagium mordax* (De Geer) (1); *Tetrops praeustus* (L.) (2). ***Chrysomelidae:*** *Aphthona euphorbiae* (Schrank) (1, 2, 4); *Cassida flaveola* L. (1); *Cryptocephalus moraei* (L.) (4);

Gastrophysa polygoni (L.) (1); *G. viridula* (De Geer) (1); *Lema obscura* (Stephens) (1); *Longitarsis parvulus* (Paykull) (4); *Oomorphus concolor* (Sturm) (1); *Phyllotreta nigripes* (Fabr.) (1); *Phyrralta viburni* (Paykull) (1); *Psylliodes affinis* (Paykull) (1). ***Ciidae:*** *Octotemnus glabriculus* (Gyllenhal) (1). ***Coccinellidae:*** *Adalia decempunctata* (L.) (1); *Anatis ocellata* (L.) (1); *Aphidecta obliterata* (L.) (2); *Coccinella septempunctata* L. (3); *Exochomus quadripustulatus*. (L.) (2); *Propylea quattuordecimpunctata* (L.) (1, 2); *Tytthaspis sedecimpunctata* (L.) (1, 2). ***Cryptophagidae:*** *Atomaria atricapilla* Stephens (2); *A. lewisi* Reitter (2); *A. linearis* Stephens (1, 4); *A. nigrirostris* Stephens (1, 2, 4); *A. testacea* Stephens (1, 2, 4); *A. turgida* Erichson (4). ***Cuculionidae:*** *Barypeithes pellucidus* (Boheman) (1, 2); *Curculio venosus* (Gravenhorst) (1); *Euophryum confine* (Broun) (1); *Nedyus quadrimaculatus* (L.) (1, 2, 4); *Otiorhynchus singularis* (L.) (1); *Phyllobius glaucus* (Scopoli) (1, 2); *P. pyri* (L.) (1, 2); *P. virideaeris* (Laicharting) (1); *Polydrusus cervinus* (L.) (1); *Tychius piciriostris* (F.) (1, 2). ***Derodontidae:*** *Laricobius erichsonii* Rosenhauer (2). ***Geotrupidae:*** *Typhaeus typhoeus* (L.) (1). Two dead imagines. ***Latridiidae:*** *Cartodere bifasciata* (Reitter) (1, 2, 4); *C. nodifer* (Westwood) (1, 2, 4); *Cortinicara gibbosa* (Herbst) (1, 3, 4); *Enicmus transversus* (Olivier) (1, 2); *Stephostethus lardarius* (De Geer) (4); ***Lymexylidae:*** *Hylecoetus dermestoides* (L.) (1). **Nationally notable B**, ***Melyridae:*** *Malachius bipustulatus* (L.) (1, 2, 3). ***Monotomidae:*** *Rhizophagus picipes* (Olivier) (1), **Nationally notable A**, ***Nitidulidae:*** *Glischrochilus hortensis* (Geoffroy) (1). ***Oedemeridae:*** *Oedemera lurida* (Marsham) (1, 3); *O. nobilis* (Scopoli) (1, 2, 3). ***Pyrochroidae:*** *Pyrochroa coccinea* (L.) (1), **Nationally notable B.** ***Rhynchitidae:*** *Deporaus betulae* (L.) (1). ***Salpingidae:*** *Vincenzellus ruficollis* (Panzer) (1), on dead, beetle-bored, *Corylus avellana* twig. ***Scarabaeidae:*** *Aphodius sticticus* (Panzer) (1); *Onthophagus joannae* Goljan (1); *O. similis* (Scriba) (1); *Phyllopertha horticola* (L.) (1, 2, 3), common. ***Scolytidae:*** *Xyleborus dispar* (Fabr.) (1), **Nationally notable B.** ***Scraptiidae:*** *Anaspis maculata* (Geoffroy) (2, 4); *A. regimbarti* Schilsky (2). ***Silphidae:*** *Oiceoptoma thoracicum* (L.) (1). ***Sphindidae:*** *Aspidiphorus orbiculatus* (Gyllenhal) (1, 2). ***Staphylinidae:*** *Philonthus cognatus* Stephens (1); *Plataraea brunnea* (Fabr.) (4); *Scaphidium quadrimaculatum* Olivier (1); *Tachporus hypnorum* (Fabr.) (1).

DIPTERA

Dioctria atricapilla Meigen. (1), common; *D. oelandica* (L.) (1). ***RDB: Nationally notable;*** *D. rufipes* (De Geer) (1, 3); *Tanyptera nigricornis* (Meigen) (1), ***RDB: Rare***.

HEMIPTERA

Cercopis vulnerata Rossi (1, 2, 3). Common; *Dolycoris baccarum* (L.) (1, 2); *Elasmucha grisea* (L.) (1); *Palomena prasina* (L.) (2); *Zicrona caerulea* (L.) (1).

HYMENOPTERA

Symphyta

Argidae: *Arge cyanocrocea* (Forster) (3). ***Cephidae:*** *Cephus spinipes* (Panzer) (2). ***Tenthredinidae:*** *Macrophya montana* (Scopoli) (1, 3). Common at flowers of *Euphorbia amygdaloides*; *Tenthredo maculata* Geoffroy (1); *Tenthredo temula* Klug (1, 3).

Parasitica

Charipidae: *Phaenoglyphis villosa* (Hartig) (1); *P. xanthochroa* Förster (1, 2, 4). ***Cynipidae:*** *Andricus lignicola* (Hartig) (1); *Saphonecrus conatus* (Hartig) (1, 4). ***Diapriidae:*** *Coptera inaequalifrons* (Jansson) (2); *Diapria conica* (F.) (1, 4); *Idiotypa maritima* (Haliday) (1, 4); *Monelata aphrodite* (Nixon) (4). Rare; *M. solida* (Thomson) (1, 2); *Paramesius rufipes* (Fonscolombe) (1, 2, 4); *Spilomicrus bipunctatus* Kieffer (1); *S. hemipterus* Marshall (2, 4); *S. integer* Thomson (2, 4); *S. stigmaticalis* Westwood (1); *Trichopria aequata* (Thomson) (1, 2); *T. basalis* (Thomson) (1, 2); *T.*

cameroni (Kieffer) (1, 4); *T. crassifemur* Nixon (1, 2); *T. nigra* (Nees) (1, 2, 4); *T. tritoma* (Thomson) (1, 2). ***Eucoilidae:*** *Disorygma depile* (Giraud) (4). ***Figitidae:*** *Anacharis eucharioides* (Dalman) (1); *Melanips opacus* (Hartig) (3); *Melanips sylvanus* Giraud (2). ***Gasteruptiidae:*** *Gasteruption assectator* (L.) (1). ***Ichneumonidae:*** *Alomya semiflava* Stephens (1); *Buathra laborator* (Thunberg) (3); *Coelichneumon biannulatus* (Gravenhorst) (3); *Ctenichneumon melanocastaneus* (Gravenhorst) (2); *Gregopimpla inquisitor* (Scopoli) (1, 3); *Ichneumon gracilentus* Wesmael(1); *I. suspiciosus* Wesmael (1, 3); *Ischnoceros rusticus* (Geoffroy in Fourcroy) (1); *Rhyssa persuasoria* (L.) (2); *Tryphon bidentatus* Stephens (1). ***Platygastridae:*** *Amblyaspis roboris* (Haliday in Walker) (1); *Iphitrachelus lar* Haliday (4); *Leptacis ozines* (Walker) (1, 2, 4); *Platygaster acrisius* Walker (1, 2); *P. euhemerus* Walker (4); *P. gracilipes* Huggert (1); *P. oscus* Walker (1); *P. tisias* Walker (1, 2); *Platystasius transversus* (Thomson) (1). Rare; *Synopeas lugubre* Thomson (4); *S. muticum* (Nees) (1). ***Proctotrupidae:*** *Disogmus basalis* (Thomson) (2). ***Scelionidae:*** *Anteris aethra* (Walker) (1).

ACULEATA

Apidae: *Apis mellifera* L. (1, 2, 3); *Bombus hortorum* (L.) (3); *B. pascuorum* (Scopoli (3); *B. pratorum* (L.) (1), at flowers of *Allium ursinum; B. sylvestris* (Lepeletier) (1), at flowers of *Allium ursinum; Hylaeus confusus* Nylander. (1). ***Bethylidae:*** *Bethylus fuscicornis* (Jurine) (2). ***Chrysididae:*** *Trichrysis cyanea* (L.) (1). ***Formicidae:*** *Formica fusca* L. (1, 2, 3); *Lasius brunneus* (Latreille) (1), ***Nationally notable A***; *Leptothorax acervorum* (Fabr.) (1). ***Pompilidae:*** *Arachnospila spissa* (Schiødte) (1, 2); *Priocnemis coriacea* Dahlbom. (1), ***Nationally notable A***; *P. perturbator* (Harris) (2, 3). ***Tiphiidae:*** *Tiphia minuta* van der Linden (1), ***Nationally notable B. Crabonidae***: *Argogorytes mystaceus* (L.) (3); *Crossocerus tarsatus* (Shuckard) (3); *Ectemnius continuus* (Fabr.) (1); *E. rubicola* (Dufour & Perris) (1); *Nysson spinosus* (Forster) (1); *Pemphredon inornata* Say. (1). ***Vespidae:*** *Dolichovespula sylvestris* (Scopoli) (1); *Odynerus spinipes* (L.) (1).

LEPIDOPTERA

Aglais urticae (L.) (3). One worn imago; *Anthophila fabriciana* (L.) (1, 2). several; *Cyclophora linearia* (Hübner), by main road to Ludlow, SO4974; *Euthrix potatoria* (L.) (1), one full grown larva; *Inachis io* (L.) (1), one worn imago; *Leptidea sinapis* (L.) (1), several; *Minoa murinata* (Scopoli) (1, 2, 3), common, some imagines nectaring at flowers of *Euphorbia amygdaloides*. ***BAP Priority Species***; *Orthosia gothica* (L.) (1), one imago; *Pararge aegeria* (L.) (1, 2), several; *Petrophora chlorosata* (Scopoli) (1, 2, 3), several; *Pieris napi* (L.) (1, 2), several; *Polyommatus icarus* (Rottemburg) (3), one fresh male; *Pseudopanthera macularia* (L.) (1, 2, 3), common; *Tyria jacobaeae* (L.) (1), one imago; *Xanthorhoe montanata* ([Denis & Schiffermüller]) (3), several.

ODONATA

Libellula depressa L. Pond near Vinnals car park, SO4773; *Pyrrhosoma nymphula* (Sulzer). Pond near Vinnals car park, SO4773.

ORTHOPTERA

Tetrix undulata (Sowerby) (1).

RAPHIDIOPTERA

Atlantoraphidia maculicollis (Stephens) (2).

THE PRESENCE OF *PHORACANTHA RECURVA* (NEWMAN) (COLEOPTERA: CERAMBYCIDAE) IN FRANCE AND HOW TO DIFFERENTIATE IT FROM *P. SEMIPUNCTATA*

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Phoracantha recurva (Newman) is a medium-sized (15–29 mm) Australian longhorn beetle that develops in *Eucalyptus* trees. It has a one-year life cycle and in Europe adults can be found from April to October. Unlike the closely related species *Phoracantha semipunctata* (Fabr.), present in Europe since 1980 and in France since 1986, it is a recent addition to the European fauna.

In Europe, *P. recurva* was first observed in Spain at the end of the 1990s (Bercedo Páramo & Bahillo de la Puebla, 1999). Hoskovec & Rejzek (1997–2007) reported one specimen from Praeveza in western Greece (collector Z. Černý) and it has since been found in Italy (Sama & Bocchini, 2003). The species is also present in North Africa (Tunisia and Morocco) and is expanding its range around the Mediterranean (Cocquempot & Sama, 2003). Worldwide it has also been introduced into the Pacific Region (Papua New Guinea, New Zealand), North and South America (California, Chile, Argentina, Uruguay, Brazil) and South Africa (EPPO, 2004).

Orousset (2000) first suggested the possible presence of this species in France and his view was shared by the authors of a subsequent catalogue of French Vesperidae and Cerambycidae (Brustel *et al.*, 2002). A male specimen was captured on large freshly-cut branches of *Eucalyptus* on 6 September 2003 in a residential area of Nice (Alpes Maritimes, France). A female of *P. semipunctata* had been collected at the same site the previous day. The male was originally misidentified as *P. semipunctata*.

Adults of the two species can be differentiated using the criteria in table 1.

The shape of the apical tooth on antennal segments 3–7 is also different in the two species (see Fig.1). In *P. semipunctata,* they are all the same shape (straight and pointing towards the apex) and are longer than the apical width of the corresponding segment. In *P. recurva*, the tooth on the third segment is long, curved and points more or less perpendicularly from the segment itself. The teeth on segments 4–7 are straight and generally no longer than the width of the corresponding segment.

The elytral colouration is usually a good indicator with yellow dominating the top part of the elytra in *P. recurva* (Fig. 2). However, I have observed a specimen of *P. semipunctata* where the two top yellow patches are merged and quite large giving it a similar appearance to *P. recurva*.

Table 1. Key differentiating characters of *Phoracantha semipunctata* and *P. recurva* (adapted in part from Bercedo Páramo & Bahillo de la Puebla, 1999)

	P. semipunctata	*P. recurva*
Antennae		
Pilosity (ventral side)	Sparse, hairs straight	Dense, hairs wavy
Posterior legs		
Femur – dorsal face	without granulation	with spiny granulation
Tarsal pads	slightly visible from the top	large, clearly visible from the top

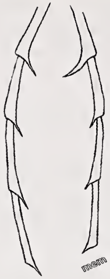

Fig. 1. Antennal segments (3–6) of *P. semipunctata* (left) and *P. recurva* (right).

Fig 2. Elytral pattern of *P. semipunctata* (left) and *P. recurva* (right).

Under artificial light, *P semipunctata* has a dark pitchy head and pronotum, while the colour is more chestnut in *P. recurva*.

For those entomologists who are interested in the Cerambycidae and visiting the Mediterranean region it might be worth checking any specimens of *Phoracantha* to confirm their identity now that two closely species are known to occur there.

Considering how the species have spread across various parts of the world and their presence in temperate parts of Argentina (Di-Iorio 2004), it does not seem impossible that they could one day also reach the British Isles.

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CALEPITRIMERUS RUSSOI DI STEFANO (ACARI: ERIOPHYIDAE), FOUND IN BRITAIN ON IMPORTED BAY LAUREL

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Abstract

The eriophyoid mite *Calepitrimerus russoi* Di Stefano is reported in Britain for the first time, on bay laurel (*Laurus nobilis* L.) in north-east Yorkshire. The distribution, detection, identification and economic importance of *C. russoi* are discussed.

Introduction

The eriophyoid mite *Calepitrimerus russoi* Di Stefano, a host-specific pest of bay laurel (*Laurus nobilis* L.) is reported in Britain for the first time, found under glass in north-east Yorkshire. The mite was discovered in May 2007 together with the common brown soft scale, *Coccus hesperidum* L. (Hemiptera: Coccidae), on a batch of 25 bay laurel seedlings. The seedlings had been potted-up in March 2007 and grown-on for experimental use at the Central Science Laboratory (CSL) glasshouse facility. The origin of the seedlings could be traced directly back from a nursery in Yorkshire, to a consignment of plants imported from Belgium in the autumn of 2006. The mites had therefore been present and breeding in Britain for at least six months prior to being discovered. In January 2008, after the data presented below had been prepared, live specimens of *C. russoi* were found on *L. nobilis* plants on a nursery near Ormskirk, Lancashire. The plants had been imported from Italy a year earlier and kept in an unheated poly-tunnel.

Three slides with 88 specimens from Yorkshire have been deposited in the collection of the Natural History Museum, London (NHM) (Accession Number BMNH (E) 2008-16) and three slides with 76 specimens and samples of infested foliage are retained at CSL (CSL ref. No. 20709567).

Distribution

Calepitrimerus russoi was described from specimens, collected in 1964, from *L. nobilis* in the garden of the Entomological Institute of the Faculty of Agriculture in Portici, on the Tyrrhenian coast of southern Italy (Di Stefano, 1966), with a fuller description and biological information being published later (Di Stefano, 1969). Since then it has been recorded in the Ukraine (Sekerskaya, 1982), The Netherlands (Burger & Vierbergen, 1987), Belgium (Vinnik *et al.*, 1998) and now in Britain. Ostojá-Starzewski (2008) has suggested that the record of an unnamed eriophyoid, described as causing characteristic and well defined multi-cellular blackish patches on the lower leaf surfaces of *L. nobilis* in 'Austro-Hungary' and Greece, Houard No. 2471 (Houard, 1908), is also *C. russoi*.

Detection and identification

With most eriophyoid mites, it is the manifestation of host symptoms that often leads to their discovery, as in this instance. *Calepitrimerus russoi* is a lower leaf surface vagrant that feeds on epidermal cells. As the mites feed, the leaves become discoloured, turning from green to a reddish brown/bronze (russetting) (Plate 8, Fig.

1). When an infestation is very heavy, this damage develops into a covering of black necrotic spots (Plate 8, Fig. 2), as observed by Vinnik *et al.* (1998) and seen on the plants in north-east Yorkshire. Eventually infested leaves dry-up entirely and fall off.

The larvae and nymphs of *C. russoi* are off-white in colour. As they mature they become progressively darker, eventually turning orange/brown. Adult mites are very small, measuring between 0.15–0.19 mm in length, and are distinctively shaped, being slightly dorso-ventrally flattened and elongate deltoid or kite-shaped in outline (Plate 8, Fig. 3). The dorsal podosomal shield (often covered in a scattering of wax fragments) is roughly diamond shaped, ornamented with a distinct pattern of ridges, and bears a pair of minute scapular setae close to the rear margin that are directed centrally and slightly forwards. The opisthosoma has approximately 50 annulations, and a medio-dorsal ridge running for 2/3 of its length from the podosomal shield backwards. This ridge is flanked on each side by slight longitudinal depressions. The opisthosoma also bears three longitudinal lines of wax plates, one arising from the dorsocentral ridge and one arising from each latero-dorsal margin (Fig. 1). Di Stefano (1969) does not mention the presence of wax plates in his description of *C. russoi*; however, these wax plates are delicate and seldom survive in slide-mounted specimens, particularly if the slides are heated (compare specimens in Fig. 1).

All the diagnostic characters are extremely small and therefore specimens need to be slide mounted for identification and viewed at high magnification ($\times 400$). Determination to genus can be made with reference to Amrine (1996), and specific identification can be made with reference to the original description (Di Stefano, 1966); a fuller re-description and key to selected species of *Calepitrimerus* is given by Di Stefano (1969), and figures and notes by Nuzzaci & Vovlas (1977) and Vinnik *et al.* (1998).

A second species of *Calepitrimerus, C. cerrosus* Nuzzaci & Vovlas, described from *L. nobilis* collected in Bari, on the Adriatic coast of southern Italy (Nuzzaci & Vovlas, 1977), could superficially be confused with *C. russoi*. This too is recorded as a vagrant that causes russetting, but is described as inhabiting buds rather than leaves. *Calepitrimerus cerrosus* differs in all measured characters from *C. russoi,* but most notably it is larger, has smaller dorsal and genital shields, longer scapular setae, and a 7-rayed as opposed to a 4-rayed featherclaw (the usual name used for the foot or empodium, a symmetrically branched tree-like structure).

Calepitrimerus russoi is unlikely to be confused with any other eriophyoid mite recorded thus far in Britain. *Calepitrimerus armatus* (Canestrini), a lower leaf surface vagrant, associated with *Crataegus* spp. (hawthorns), is the only other member of the genus recorded in Britain (Bagnall & Harrison, 1928); however, there appear to be no records of *C. armatus* since 1928, and Ostojá-Starzewski (2008) has expressed concerns regarding the validity of Bagnall & Harrison's records. Therefore, the status of *C. armatus* in Britain needs to be confirmed.

Economic importance

Laurus nobilis is a very popular and widely grown woody shrub/tree cultivated both as a garden ornamental and for its aromatic leaves used in cookery. Infestation by *C. russoi* can cause serious foliar damage; it affects the aesthetic appearance of the host and renders the leaves unsuitable for culinary purposes. There is no specific information available regarding the economic impact of *C. russoi*; however, Vinnik *et al.*, (1998) state that, of the four species of eriophyoid mite found on *L. nobilis* in Belgium, *C. russoi* is considered to be the most damaging and Burger & Vierbergen (1987) report some damage to glasshouse grown *L. nobilis* in The Netherlands.

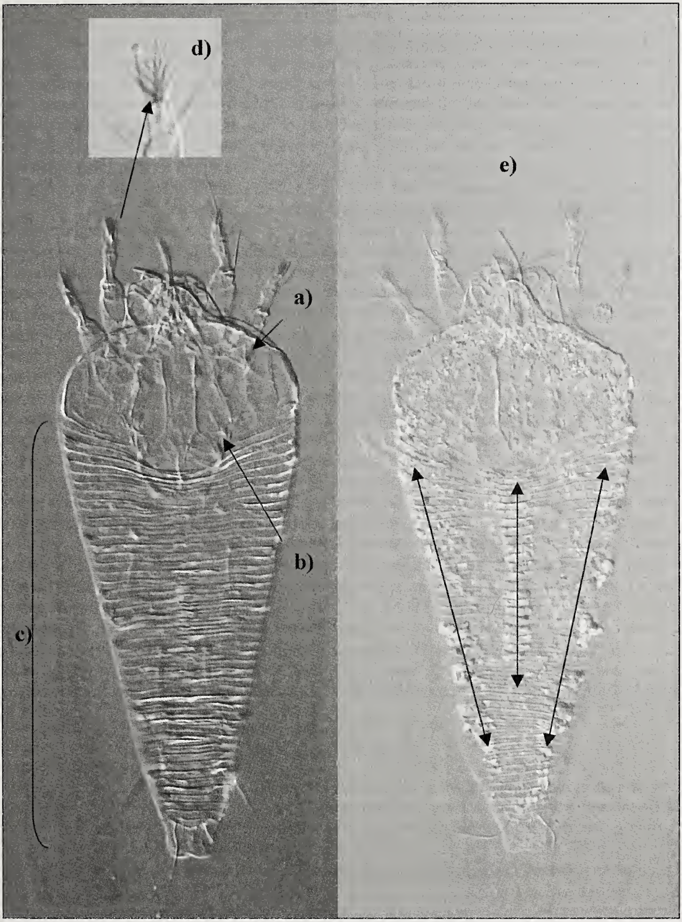

Fig. 1. *Calepitrimerus russoi* Di Stefano – slide mounted females (× 400). (a) podosomal shield; (b) scapular seta; (c) opisthosoma; (d) inset, the 4-rayed featherclaw; (e) arrows indicating the position of the wax ridges.

Discussion

The host symptoms observed on the *L. nobilis* in north-east Yorkshire were quite severe; symptoms that were perhaps promoted by the artificial cultural conditions under which the plants were grown, i.e. temperatures of between 12°C (night) rising to 21°C (day) with additional lighting. These conditions were set to encourage the plants to produce new growth, but clearly also favoured the development of the mites. In normal circumstances one would expect to find natural predators such as phytoseiid mites actively feeding on the mite colonies, thereby keeping them in check, but no predatory mites were present. The plants were treated with one application of Talstar (bifenthrin 80g/l) that successfully eradicated the mites.

Calepitrimerus russoi is a southern/central European species (confirmed from Italy and the Ukraine), that can survive under glass in northern Europe, (Britain (reported here) and The Netherlands (Burger & Vierbergen, 1987)). It is not known whether *C. russoi* is capable of surviving outdoors in Britain. Vinnik *et al.* (1998) reported *C. russoi* from nurseries in Belgium, but did not indicate if this was under glass or outdoors. If *C. russoi* occurs outdoors in Britain, it is inconspicuous. Environmental conditions, naturally occurring predators, a combination of both or other factors could be suppressing populations, thus preventing the most severe host symptoms from being expressed. Seven species of eriophyoid mites have been described from *L. nobilis* to date, namely: *Calepitrimerus cerosus* Nuzzaci & Vovlas, *C. russoi*, *Cecidophyes lauri* Nuzzaci & Vovlas, *Cecidophyopsis malpighianus* (Canestrini & Massalongo), *Diptacus camarai* Carmona, *Epitrimerus carmonae* Keifer and *Eriophyes lauricolus* (Nuzzaci & Volvas). *Calepitrimeus russoi* is only the second of these aforementioned species to have been reported in Britain, the other being *C. malpighianus*, apparently recorded by Bagnall & Harrison (1917) and confirmed as present by Ostojá-Starzewski & Wurzell (2006).

Eriophyoid mites are very small and difficult to detect especially when present in low numbers, and in the early stages of infestation the host plant does not always exhibit obvious symptoms. There are other known examples of non-native eriophyoids being accidentally introduced into Britain with their hosts, e.g. *Aceria ficus* (Cotte, 1920) and *Rhyncaphytoptus ficifoliae* Keifer (Keifer, 1939, Ostojá-Starzewski, 2002). It is possible that there are other introduced eriophyoid species in Britain that have yet to be recorded, including some of the other species known to inhabit *L. nobilis*.

Acknowledgements

The author wishes to thank Mr. R. Natt (Horticultural Manager, Central Science Laboratory) who brought the mites to his attention, Sara Brough (Plant Health and Seeds Inspectorate) for collecting specimens of *C. russoi* from Lancashire and David Crossley (CSL) for the images used in Plate 8. This work was funded by the Plant Health Division of Defra, under the authority of Licence Number PLH251B/5328 (02/2006) amended (04/2006).

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FIELD MEETING REPORTS

Sheppey Cliffs, Kent, 27th May 2007

Leader: **John Badmin**. – This joint meeting with the Kent Field Club coincided with a wet weather front and was abandoned within an hour of starting due to steady rain falling. The cliffs here along the northern edge of the island are exposed to regular erosion by the sea and there is a succession of tumbled cliff deposits, in various stages of revegetation. Patches of open ground have been colonised by the rare yellow pea, *Tetragonolobus maritimus* (Dragon's Tooth), probably its best location in the UK. The flowers are attractive to bees over a particularly long period despite peak flowering in early summer providing a nectar source well into autumn.

Bumblebees were flying and included the widespread *Bombus terrestris* (L.), *B. lapidarius* (L.), *B. hortorum* (L.) and *B. pascuorum* (Scopoli) together with a few individuals of the local Shrill carder bee *Bombus sylvarum* (L.). Also nice to record in an almost treeless landscape was the bug *Issus coleoptratus* (Fabr.) from an ivy-clad hawthorn bush, its third locality on Sheppey.

Roger Booth visited the site in better weather in July and recorded 26 species of beetle including our smallest longhorn *Gracilia minuta* (Fabr.), a mere 2.5 mm long. This very local and probably declining (RDB2) species was swept from bramble on the mid-slopes.

The other dominant plant on the tumbling cliffs is *Tussilago farfara* (Colt's-foot) and since reading 'Life on the edge – key coastal soft cliffs for invertebrates in

England and Wales' by Mike Howe, Andrew Whitehouse and Guy Knight (*British Wildlife* **19**: 172–181) the habitat looks ideal for *Scrobipalpula tussilaginis* (Stainton).

Rushenden Marshes, Sheppey, 12 August 2007

Leader: **John Badmin**. – This was billed as a joint meeting of the Kent Field Club and the British Entomological & Natural History Society and this proved to be the case, with approximately equal numbers of members attending from both societies We met at Rushenden by the seawall, on what appeared to be a very sunny day. The day began with a discussion over the accuracy of the grid reference given for the meeting place and the BENHS member who queried this was outvoted by three to one by KFC members whose GPSs were obviously calibrated more accurately to 'Kent space'. These days it seems that GPSs are becoming as commonplace as mobile phones, and the day is fast approaching when a visit to a remote spot, off track, will no longer seem truly 'wild and desolate' as we will know exactly where we are all day. Well, I am glad to say we were so engrossed in surveying the varied habitats in this remote western corner of Sheppey that time just flew by.

We briefly looked at the vegetation along the sea wall and derelict railway track that leads to the pier and spotted a couple of plants of narrow-leaved ragwort *Senecio inaequidens*, a South African species currently rapidly extending its range in southern England. We need not have become quite so excited, as when we clambered over the bank to the south of the track we discovered the ground was covered with literally thousands of plants of this species, almost as far as the eye could see. This area west of Rushenden Hill to the sea wall, referred to as Rushenden Marshes on the map has been landscaped in recent years using a lot of dumped top soil. This has been worked with bulldozers into extensive patches of flat, almost impervious soil which have developed a sparse pioneer saltmarsh flora being so near the sea.

Workers of the common bumblebees *Bombus terrestris* (L.), and *B. pascuorum* (Scop.) were noted visiting flowers in the taller vegetation together with reasonable

Fig. 1. Polygonal patches of beard grass *Polypogon monspeliensis*, Rushenden Marshes, Isle of Sheppey, 2007. (Photo: John Badmin).

numbers of the local shrill carder bee *B. sylvarum* (L.). Several individuals of the Thames estuary pyralids *Evegestis extimalis* (Scop.) and *Sitochroa palealis* (D. & S.) were disturbed and admired. Two individuals of the handsome cicadellid *Athysanus argentarius* Metcalf were noted, a species first recorded in the area by Walter Le Quesne in 1979. A singleton clouded yellow butterfly *Colias croceus* Geoffroy was observed through binoculars flying through three tetrads before finally disappearing out of sight.

There was a fairly extensive patch of the local beard grass *Polypogon monspeliensis* on the edge of the saltmarsh. Here the soil had dried and cracked into polygons each about a metre wide creating a very unusual habitat not covered by the NVC classification (Fig. 1). Apart from *A. argentarius* no unusual invertebrates were recorded from here.

Across the open saltmarsh pans our attention was drawn to many hundreds of emergence holes of varying sizes. The coleopterists amongst us (Eric Philp, Roger Booth and Allan Lawson) rose to the challenge and with various slightly dodgy implements began digging down into the substrate to find some beetles. Eventually a number of specimens were retrieved and these all proved to be the Notable A staphylinid *Bledius bicornis* (Germar). This rove beetle is extremely rare in Kent and previously known only from the east coast at Pegwell Bay. It is obviously doing extremely well at this site. Also present was a mysterious carabid, which may best be described as the bipunctate form of *Dyschirius nitidus* Dejean. There were some much larger exit holes dotted around but we never established who the instigators were, though we suspected hymenopterans.

Here the leader's attention was drawn to a very active muscid fly, which flitted around and settled on the bare earth for a few seconds (just out of reach) before flying off again in the company of one or two congeners. It took the best part of 15 minutes and the use of two nets before a single individual was captured. A longer-handled net would have made life much, much easier. The fly proved to be *Lispe caesia* Meigen (det. Laurence Clemons), a rare species, more normally associated with pond surfaces in coastal regions, and surprise surprise known elsewhere in Kent, only from Sandwich Bay.

Richard Moyse was first to encounter bee wolf *Philanthus triangulum* (Fabr.) and then two small nesting colonies were discovered in the side of the sea wall confirming that this invader is now well established on the island. Other Hymenoptera noted were *Andrena pilipes* s.s., *Dasypoda altercator* (Harris), *Cerceris rybyensis* (L.) and *Ectemnius continuus* (Fabr.). Allan Lawson recorded the Notable B ladybird *Hippodamia variegata* (Goeze).

More verdant 'natural' patches of saltmarsh open to regular inundation by the sea were present all the way along the western sea wall. There were quite large stands of sea aster, golden samphire and sea wormwood. Notable insects included the very local leafhopper *Chlorita viridula* (Fallén), the tortricid *Eucosma tripoliana* (Barrett) and the RDB tephritids *Campiglossa absinthii* (Fabr.) *and Myopites eximia* Séguy.

We returned to our cars by way of the Point. Here the saltmarsh in the bay was much more substantial with pioneer *Spartina anglica*, large stands of sea purslane and appreciable amounts of sea lavender, sea aster and sea wormwood. The *Limonium* proved especially fruitful: Allan Lawson recorded the Notable B weevil *Pseudaplemonus limonii* (Kirby), Roger Booth, the rare *Mordellistena nanuloides* Ermisch and Eric Philp swept the weevil *Baris scolopacea* Germar This last species was recorded as new to Britain from this very saltmarsh by Messrs Walker and Champion about a hundred years ago and until this time had not been recorded from the island since its discovery. This proved a suitably high note on which to close the meeting and to take cover as some rain swept in from the sea.

Quite a truly remarkable locality with a longish list of notable species that requires further investigation. Bound to be built upon as the Thames corridor expands.

INVERTEBRATE LINK (JCCBI)

Statement on the appropriate role of legislation in controlling activities likely to harm specified taxa of terrestrial and freshwater invertebrates, with particular reference to taking and killing

1. Purpose and scope of this statement

This statement is intended as guidance for everyone with an interest in laws intended to protect specified taxa of terrestrial and freshwater invertebrates in the wild. It sets out basic principles and emphasises the need for legislation to be based on *reliable evidence*. Paragraphs 2 and 3 refer to the principles that should be taken into account when considering legal measures to protect particular invertebrates, whether by safeguarding their habitats or by any other means. Paragraph 4 sets out criteria for deciding whether particular invertebrate species should be scheduled for protection in relation to *taking or killing*. Additional control over these activities should be promoted through voluntary individual restraint, so as to fulfil a proper degree of personal responsibility towards invertebrates in the wild (for example, as represented by this Committee's publication "*A Code of Conduct for Collecting Insects and Other Invertebrates*[1]".

2. Potential reasons for enacting legal controls[2]

Arguments for legal protection of particular invertebrate taxa in the wild could be advanced for various reasons, including:

- The occurrence of activities likely to result in extinctions of the species concerned
- The need to protect habitats and ecosystems where those species occur
- Support of conservation management objectives at particular sites
- Regulation of the use of natural resources (e.g. for commercial exploitation)
- The upholding of moral values in human utilisation of wildlife

3. Practical reasons for ensuring that legislation is kept within bounds defined by reliable evidence

- For the conservation of invertebrates, the *protection of habitats* is generally more important than that of specified taxa. This is even more the case than for vertebrates, whose populations generally can be harmed more by the killing or taking of individuals. Legislation needs to reflect this balance proportionately.
- Invertebrate conservation depends on *knowledge* gathered by naturalists and scientists, who may need to take specimens for identification and study. There is a need to foster a climate in which this work can be done and be taken up by new generations without needless discouragement or impediment.
- Inappropriate laws may impede not only the study of invertebrates in general but also the conduct of particular studies, which are essential for conservation (e.g. the recording of species covered by the *UK Biodiversity Action Plan*) or environmental monitoring.
- The implementation of laws is costly for government agencies, and imposes a frequently unfulfilled need to apply the law correctly and consistently. There is a cost also to voluntary organisations which are, for example, effectively required

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[1] Invertebrate Link (JCCBI) (2002). A Code of Conduct for Collecting Insects and Other Invertebrates. *British Journal of Entomology and Natural History* **51**: 1–6.

[2] In addition to the reasons listed here, there are international obligations whereby nations must provide legal protection for various listed taxa, irrespective of the national or regional conservation status of those taxa.

to ensure legal compliance by people using their facilities. Bad laws can unnecessarily *divert resources* away from worthwhile work, which could help to conserve invertebrates.

4. Criteria for deciding whether any particular species should be scheduled for legal protection with respect to taking or killing in the wild

The central criterion is as follows: that, *according to all reliable evidence, these activities would significantly increase the risk of any of the regionally, nationally or internationally important populations of the species becoming extinct.* In this context, the scale and purpose of the activity should be taken into account, so as to decide the exact nature of the legal protection (if any) that is judged to be appropriate. For example, taking large numbers of specimens for trade or killing numerous individuals as an incidental result of site development is likely to be far more harmful than the removal of small numbers of specimens for study or for the development of personal collections. Each of the following questions should be addressed, where relevant, and according to the best available information:

- **Current status and geographic distribution of the species**
- *Is the species known to exist only in very few, small populations within the country or region concerned?*
- *Are its populations in serious decline on a regional, national or international scale?*
- *Do its populations within the country concerned represent a highly significant part of its international distribution?*

- **Resilience/vulnerability/viability of populations**
- *What is the likely minimum size from which the population could permanently recover following a low point?*
- *How quickly might a population recover from a low point (e.g. on the basis of fecundity, generation time and survivorship)?*
- *What is the inherent ability of the species to found new colonies (re-establishment potential)?*
- *If a local population were to become extinct, what effect would this probably have on the viability of any wider metapopulation?*

- **Ease of collection, attractiveness to collectors and side-effects of collecting**
- *Is the species easily collected?*
- *Is it likely to be collected?*
- *Is collecting pressure likely to contribute a significant risk to population viability?*
- *How vulnerable is its habitat to damage in the course of collecting?*

If the above questions cannot be answered on the basis of reliable evidence, such evidence should in principle be sought before proposing any legal protection for the species concerned. If, however, this is impracticable and if there are strong circumstantial indications that the activities under consideration are placing the species at serious risk (or would soon do so), *there may be a case for invoking the precautionary principle.*

5. Consultation

Detailed consultation with all appropriate organisations should begin at the preparatory stages of any legislation. In the UK, these include all the national organisations concerned with the study or conservation of invertebrates and the forum to which they belong, namely Invertebrate Link (JCCBI).

This statement has been endorsed by the following Invertebrate Link (JCCBI) member organisations: Amateur Entomologists' Society; Ancient Tree Forum; Bees, Wasps & Ants Recording Society; British Dragonfly Society; British Entomological & Natural History Society; British & Irish Association of Zoos & Aquariums (Terrestrial Invertebrate Working Group); British Myriapod & Isopod Group; Buglife – The Invertebrate Conservation Trust; Conchological Society of Great Britain & Ireland; Dipterists' Forum; Field Studies Council; Freshwater Biological Association; Linnean Society; National Trust; Natural History Museum; Royal Entomological Society; Royal Horticultural Society.

INVERTEBRATE LINK (JCCBI), c/o The Royal Entomological Society,
The Mansion House, Chiswell Green Lane, St. Albans, Hertfordshire AL2 3NS.

SHORT COMMUNICATION

A record of *Vanessa itea* (Fabr.) (Lep.: Nymphalidae) from North Kent

The buddleja in our garden has been particularly unattractive to insects this year, as I believe has been the general case, at least in Kent. All the common vanessid butterflies have been scarce, with *Vanessa atalanta* (L.) being one of the species most frequently seen. Consequently, whilst mowing the lawn near a small buddleja bush in the garden in the late afternoon of 2 August 2008 I was pleased to see a butterfly about the size of *Aglais urticae* (L.) hovering over one of the flowers. However, when it alighted and started to feed I was surprised to see it was of a species I had never seen before. The general shape was of a small *V. atalanta*, however, in place of the diagonal red band on the forewing of *V. atalanta* there was a pale yellow elongated ellipse. The net was not too far away and I managed to catch it. I had the feeling that I had seen an illustration of it somewhere and managed to track the species down to *Vanessa itea* (Fabr.) by recourse to Hudson (1928) (Plate 5, Fig. 10). It is also illustrated in Smart (1985) and there are many good photographs on the Internet. This is an Australian species that is found throughout the Australian continent and some of the nearby islands. It is a strong migrant and is regularly found in New Zealand. The larval food plants are various species of Australian *Urtica* and related species. It will also feed on the holarctic *Urtica urens* (annual nettle).

The origin of this individual is of some speculation as amateur entomologists are known to breed and rear this attractive species in the UK and an escape from captive rearing must be the most obvious source. An alternative place of origin could the international freight depot about two miles away. – P. J. JEWESS, Boyce's Cottage, Newington, Sittingbourne, Kent ME9 7JF, e-mail: philip_jewess@hotmail.com

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BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY
VOLUME 21, PART 3, SEPTEMBER 2008

June 2008 ISSN 0952-7583 Vol. 21, Part 2

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY

BRITISH ENTOMOLOGICAL & NATURAL HISTORY SOCIETY

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY
Published by the British Entomological and Natural History Society and incorporating its Proceedings and Transactions

British Journal of Entomology and Natural History is published by the British Entomological and Natural History Society, Dinton Pastures Country Park, Davis Street, Hurst, Reading, Berkshire RG10 0TH, UK. Tel: 01189-321402. The Journal is distributed free to BENHS members.

Typeset by Tavistock Digital Data, Tavistock, Devon.
Printed in England by Henry Ling Ltd, Dorchester, Dorset.

BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY
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Cover photograph: Marsh Mallow Moth *Hydraecia osseola* spp *hucherardi* (Photo: D. G. Green).

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AN OUTBREAK OF *LIBYTHEA CELTIS* LAICHARTING (LEPIDOPTERA: LIBYTHEIDAE) IN THE BASSES-CÉVENNES, FRANCE

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ABSTRACT

A mass eclosion of *Libythea celtis* (Nettle-tree butterfly) in the Basses-Cévennes, France in June 2007 is described. It was both localised and unusual, and appears to be characteristic of libytheans worldwide. The origins of the outbreak are explored especially with respect to any synchrony with the weather, and the migratory status of the species is examined. Field observations of the butterfly lend support to the view that the range of the butterfly is increasing in Europe, possibly related to global warming.

THE EVENT

Driving through clouds of butterflies is always a pleasure in the Cevénnes, and the spring of 2007 brought an unusual occurrence. I would like to report a mass emergence of the Nettle-tree butterfly *Libythea celtis* Laicharting (Libytheidae) in the Basses-Cévennes in early June 2007.

The occurrence was seen in the hamlet of Sannisac (251 m) just north of the town of Sumene, in the département of Gard (30). What was witnessed initially was clouds of butterflies along the roadside. Closer inspection indicated that these were all Nettle-tree butterflies.

This large population appeared to be fairly localised, as it was not repeated up or down the valley for at least 5 km. The evidence points to an opportunistic exploitation of the local nettle trees *Celtis australis* L. (Ulmaceae) (Plate 1, Fig. 1).

Photographs were taken immediately and from these it was possible to count over 400 adults feeding at the side of the road, all spread out along some 300 m of roadside verge (Plate 1, Figs 2 & 3). The aggregation was noticed on two days, the 4 and 5 June. Peak activity was between 1130–1330 h (when the temperature was 29°C) – the aggregation was not present at 1030 h in the morning and was completely gone by 1600 h.

The verge in this place was generously strewn with sheep droppings blown to the roadside – for this is a rural area where sheep movements along roads are regular. With overnight rain on the 3 June the verge was just in the right condition of humidity and nutrients to attract butterflies for mud-puddling.

It was suspected, but not verified, that the mud-puddling was only part of a wider local phenomenon, since the road is about 30 m from a wide open stream in the valley bottom, along which there would have been other opportunities for the butterfly to congregate.

WHERE HAD THEY COME FROM?

Scouting around the area it was clear what had happened. The local grove of nettle trees had been defoliated by a large infestation of the larvae during April and May resulting in a mass emergence of adult butterflies a month or so later In the immediate area were 33 nettle trees, all defoliated. In this hamlet the nettle trees have

not grown up with single stems, but appear to have been coppiced, such that each nettle tree comprised between 6–12 stems. Each of these stems was like a mature nettle tree in its own right, all forming a grove.

This growth arrangement seems to be typical of this area, for the hills are covered in native *Quercus ilex*, introduced *Robinia pseudo Acacia* that has run riot everywhere, with good amounts of *Sambucus nigra* and *Ficus*. The habitat can be described as overgrown agricultural terraces, with un-managed young riparian vegetation.

A nettle tree by itself is a rarity here, but as occasional clumps, very typical. The nettle tree is the only foodplant of *L. celtis*; both the tree and the butterfly are characteristically southern European species. The nettle trees were completely defoliated with the midribs of leaves hanging down like broken silk threads and the pupae lined up along the twigs as if in a captive breeding farm (Plate 2, Fig. 1). Butterflies had emerged from the pupae and were resting on the bare stems and twigs of the trees (Plate 2, Fig. 2). Others were hatching from pupae formed on this year's roadside thistles (*Cirsium* spp.) but the majority had not wandered any great distance from where they had completed feeding. The total estimated population of adults was likely to have been in the thousands.

How unusual was the event?

For many years, in this part of Gard, it was always noteworthy if singletons of this species were seen in any one year. Thus in the *Check List of the Rhopalocera of the Parc National des Cévennes*, it was stated that single specimens were recorded in 1969 and 1974 and that the species was 'infrequent' (Feltwell, 1977). This had to be modified six years later since it was stated that '. . . The latter *(L. celtis)* has seen a steady increase in numbers over the last few years, such that it can now be regarded as frequent rather than rare.' (Feltwell & Burton, 1982).

This particular event may of course be repeated annually in different parts of the Cévennes but it has not been reported, as the countryside still remains as wild and inaccessible as ever and is hardly visited by entomologists. It is not mentioned by Hervé Harant and Daniel Jarry who have supplied much narrative about the fauna of the Cévennes and environs (Harant & Jarry, 1982) including sections on defoliating insects of the area.

The propensity of adults, fresh out of hibernation, to gather together on apple trees to drink the juices from fresh apple buds had been noted earlier (Feltwell, 1983), but not in such staggering numbers. It is noted that Tolman (1997) stated that 'Freshly emerged adults often congregate in large numbers to drink on damp ground' (Tolman, 1997). And it is further noted by R.H. Carcasson that the African Snout *L. labdaca* Westwood is 'often attracted in large numbers to muddy puddles, sweaty clothes and carrion' (Carcasson, 1981).

The great collator of data on butterfly migration, C.B. Williams did not mention *L. celtis* in his monograph on migration in butterflies worldwide, but he did mention five other *Libythea* species from the New World, Africa and Asia in which there were aggregations or migrations, e.g. 'massing in thousands on damp patches.', 'vast numbers over an area of 100 miles square.' 'unbelievable numbers flying always in the afternoon.' and equally unbelievably 'Millions over a front of 250 miles . . . in Texas for *L. bachmannii* (Strecker) (Williams, 1930). It would seem therefore libytheans have a propensity to aggregate and migrate.

The Basses-Cévennes is increasingly afflicted by the depredations of the Gypsy Moth *Lymantria dispar* L. that has a devastating visual effect on the landscape. The

larvae are catholic in their choice of pabulum, eating most of what it in their way, but this outbreak of *Libythea* is unusual in only affecting a small patch of nettle trees. However, the visual effect on the trees is exactly the same as an attack by Gypsy moth with the trees completely skeletonised (Feltwell, 1989).

Ecological significance

There are various external factors that may have worked together to produce this very local emergence. First the weather during April and May had been unusually wet. Second, the insect parasitoids may not have been in a position to exploit the life stages as quickly as they might, for an inspection of the tree twigs did not show any obvious parasitoid activity. Third, predators seemed to be absent from the trees when there were still lots of pupae and adults on the trees. A house sparrow was seen making short exploratory flights to the trees as if to feed, but flew away each time. It is quite possible that the secondary plant substances in *Celtis* may have been sequestered in *Libythea* thus making them unpalatable. The leaves are known to be a vermifuge.

C. B. Williams, recorded many references to local wet weather apparently initiating the emergence of *Libythea* spp. (Williams, 1930). He records that in southern Nigeria Nettle-tree butterflies migrate following rain, and he says 'The negro peasant knows that after that (the rain) he may safely sow his cereal crops.' So synchrony with the weather may in some places be more regular than occasional within the genus.

Migration

This mass emergence would certainly put the species in a good position to migrate. The advantage of moving out of this localised area of finite food sources and moving to a less competitive area with more nettle tree leaves per larva is apparent. In this area of the Cévennes there would be selective advantage in moving out of the breeding area and founding new populations. However, no evidence of migration was collected on this occasion.

The question of whether *Libythea* uses these occasions to migrate is therefore raised. *Libythea celtis* is usually quoted as being a migrant in Western Europe (Higgins, Hargreaves & Lhonoré, 1983), but any migration would be tempered by the availability of foodplants, and in this case, *C. australis* is restricted to the Mediterranean coast. Any move northwards would be ruined by the complete absence of its foodplant.

In its natural range *L. celtis* extends from North Africa and the Mediterranean eastwards to Japan. In Japan the Nettle-tree butterfly is supported by *Celtis sinensis* Persoon, and the butterfly 'seems to live in comparatively stable conditions, its population density seems not to fluctuate widely and food shortage is unlikely to occur . . .' (Akayama, 1981). Akayama studied *L. celtis* in the laboratory by breeding the larvae at different densities, but found no real difference in flying fitness, between those bred under solitary or highly dense conditions. Unlike armyworms and locusts that exhibited phase variation at different densities, and had more fat content under dense conditions (thus making them more suited for migration), Akayama concluded that *L. celtis* 'seem not to be adapted for migrations in spite of their small wing loading.' In this part of the world migrations of *L. celtis* had not been reported according to Akayama.

In Cyprus the species is regarded as an occasional migrant (Makris, 2001) but Higgins, Hargreaves and Lhonoré (1983) sum it up well by saying that it has the propensity of turning up in different places. This suggests more local movements that turn out to be profitable (when they locate the foodplant that is the limiting factor) rather than migration.

Global warming

It has already been noted above that *L. celtis* appeared to have been increasing its numbers locally between 1977 and 1983. Today it appears to have continued this trend. This appears to have also been matched by the increasing spread of *Celtis* north up the valley, for the tree is now found increasingly as a roadside opportunistic weed. These present observations on the dynamics of the populations of the butterfly and its foodplant could well be of significance. Indications that the butterfly has been increasing northwards in eastern Europe due to global change has already been established (EIS, 2003; Turèáni, Kulfan & Minïá, 2003) and this evidence supports this theory.

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CONSERVATION OF THE MARSH MALLOW MOTH *HYDRAECIA OSSEOLA HUCHERARDI* MABILLE (LEPIDOPTERA: NOCTUIDAE) ON ROMNEY MARSH

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ABSTRACT

A brief history of the Marsh Mallow Moth *Hydraecia osseola* Mabille in Britain is presented, along with notes on its distribution in Europe. Recent survey and monitoring effort of the populations on Romney Marsh, Kent/East Sussex, are detailed with the historic and recent threats discussed. Conservation efforts, with examples of management issues are given and the suggested minimum ecological requirements for the moth are identified. Suggested criteria for confirming the presence of a resident population at individual sites are also given.

INTRODUCTION

The Marsh Mallow Moth *Hydraecia osseola hucherardi* Mabille, also known as the Giant Ear, has been known in the UK for over 50 years, but has only been found in East Sussex and Kent (Plate 3). The moth flies from late August to early October, frequenting river-banks, and ditches and marshy places on grazing levels. It can sometimes be found in numbers near its sole larval foodplant, marsh-mallow *Althaea officinalis* L. (Malvaceae), the larvae feeding on the roots of the plant from May to late July with the eggs over-wintering on the plant or adjacent litter (Kettlewell, 1954; Skinner, 1998; Waring, Townsend & Lewington, 2003).

It is listed as Rare (RDB 3) in Shirt (1987), but this was upgraded to Endangered (RDB 1) in Waring (1993). In 1999 a UK Biodiversity Action Plan (Species Statement) for the species was published in UK Biodiversity Group (1999), with the action listed as monitoring only, with a detailed Species Action Plan for Sussex being produced in 2004 (see *http://www.biodiversitysussex.org/marshmallowmoth.htm*). In 2000, Butterfly Conservation's *Action for Threatened Moths Project* contracted the second author to undertake a survey of the species on Romney Marsh, as well as to monitor one site on the Marsh. This project has continued annually since then and now covers monitoring of all known populations on Romney Marsh, along with additional survey effort and management advice.

CONTINENTAL DISTRIBUTION

Kettlewell (1954) stated that 'Until very recently *Hydraecia hucherardi* Mabille had only been known from France' with it being described new to science in 1907 from Royan. Subsequently it was found elsewhere in France, but by the time of Kettlewell's paper it was only known from coastal districts in north, south and west France. However, Kettlewell adds that *H. hucherardi* was considered to be possibly conspecific with *Hydraecia osseola* Staudinger (from Siberia) and also *Hydraecia murciegoi* Fernandez (which was claimed as a good species from Spain), though clarification of the taxonomic status of these taxa was needed. *Hydraecia hucherardi* is now treated as a subspecies of *H. osseola* with *H. murciegoi* a synonym of *H. osseola hurcherardi* (Zilli, Ronkay & Fibiger, 2005).

Bretherton, Goater & Lorimer (1983) give the species as Eurasiatic and state that it 'has an extremely restricted distribution in western Europe' listing a few coastal areas in France, and adding that, as in England, it is often absent from places where the foodplant is common. Karsholt & Razowski (1996), give *H. osseola* as being recorded in Europe from France, Spain, Italy (including Sardinia), Romania and Greece. Zilli, Ronkay & Fibiger (2005) report the species as having a disjunct distribution, being known from the Black Sea coast in Romania to the Tien Shan region, and, in Western Europe, having a restricted Atlantico-Mediterranean range. The western populations are ascribed to subspecies *hucherardi* (Mabille) and are found only in England, France, Spain and Italy.

For France, Robineau (2007) records that it is known around coastal regions in the Mediterranean and along the Atlantic coast, the Pyrenées-Orientales and the mouths of the Rhone, Gironde and the Seine. Parsons (2001) briefly investigated the European status of the moths on the UK Biodiversity Action Plan, seeking information from country specialists. Only those from Italy and Spain responded with data on *H. osseola*, reporting the species to occur on perhaps only 4 and 7–8 sites respectively, with the trend for these populations unknown. The species is clearly exceedingly localised in western Europe.

A Brief history of the marsh mallow moth in Britain

The Marsh Mallow Moth, hereafter referred to as *H. osseola*, was first recorded in Britain in 1951 at a streetlamp at Hailsham, East Sussex, with a second example found in the same area in 1952, although it was never seen there again (Pratt, 1999). In 1953 the species was found near a disused canal about a mile from the Kent side of the county border at Stone (Pratt, 1999), where it was recorded again the following year, with two other sites also being located in the general area during autumn of the same year. Over 70 individuals were recorded in this part of Romney Marsh during 1954 (Kettlewell, 1954). Also during that autumn it was determined that the larval stage fed in the roots of marsh-mallow with several pupae being found (Kettlewell, 1954; Goodson, 1955 & 1956). Goodson (1956) referring to chemical control of the plant added, that 'there is so much on uncultivated ground that there is no danger of it disappearing'. By 1956 it was said of the moth that "There is no doubt that it is to be found virtually everywhere in the Romney Marsh where the mallow flourishes and that it is now a really common species in this restricted region" (de Worms, 1957).

From this date *H. osseola* was recorded at a number of sites on Romney Marsh in Kent and Sussex. In Sussex it was found near Rye, Camber, Jury's Gap, Church Farm House at Guldeford, along the Military Canal between Houghton Green and Stone Bridge (Pratt, 1999), with records in Kent listed from Appledore, Fairfield, Greatstone, Ham Street village, Snargate and Stone (Chalmers-Hunt, 1962-68). There are also records from Dungeness in 1967 and Dymchurch in 1978 (two) (Chalmers-Hunt, 1968-1981). By the late 1960s the moth appeared to have become scarcer, or at least less frequently recorded, and was only occasionally seen at Houghton Green during the 1970s with the last record there in the period being in 1985 (Pratt, 1999). Away from Romney Marsh a single example was found near Rochester in 1975 (Saunders, 1975) and the species is now well known from the banks of River Medway at Burham, with it also being found nearby at Wouldham. A single example was recorded in 1999 from the western side of the Medway, at Holborough Marshes (I. Ferguson, *pers. comm.*), this the sole West Kent record.

In 1994, the moth was rediscovered on Romney Marsh at Moneypenny, near Rye (Waring, 1995; Pratt, 1999), and in 1999 a second colony was located on the Kent

side of the border near Brookland (Clancy, 2000). During the late 1990s a number of individuals, probably wanderers, were recorded away from these two colonies, these from:

(i) Kent
Appledore (1997) (J. Whiteside)
New Romney (1997) (S. P. Clancy)
Dymchurch (1998) (J. Owen)

(ii) East Sussex
Winchelsea Beach (1997 and 1999) (P. Philpot and D. C. G. Brown, per P. Troake)
Icklesham (1998) (I. Hunter per P. Troake)
Rye Harbour NR (1999 – two) (P. Troake)
Scots Float Sluice, near Rye (1999 – two) (R. Bell)
North Point, near Rye (1999) (D. C. G. Brown, per P. Troake)

There has been considerable debate as to whether the English colonies were the result of immigration and subsequent establishment or that the species had been an overlooked resident. Although this is unlikely to ever be satisfactorily resolved, given the apparently extremely localised distribution abroad, along with it also occurring in north Kent as well as on Romney Marsh and combined with the lack of records from other parts of the country, it is the authors' opinion that this species may well have been present here some time before its discovery.

Survey and monitoring of Romney Marsh populations from 2000 onwards

Aims and Methods

The aims of the project in 2000 were to monitor the population discovered in 1999 at Old Cheyne Court, Kent, and to survey potential sites for the species. Annual monitoring of further populations at Woodruff's Farm, Kent (discovered in 2001), and at Moneypenny Farm, East Sussex, was initiated in 2002 and 2003, respectively.

Sites were selected for survey at the beginning of the project on the basis of information supplied by the Romney Marsh Countryside Project. These were sites where stands of a minimum of 20 marsh-mallow plants had been identified in previous seasons. Additional sites, from personal observations (SPC) and other sources were also included. As the moth exhibits a strong dusk flight and can also often be found at rest on the plant, these sites were surveyed by a torchlight search of the foodplant from dusk onwards up until about three hours after dark. Some sites were also surveyed using portable 8-watt Heath traps left overnight. In subsequent years potential sites were visually assessed by day in July and August for their potential suitability, some sites being rejected as unsuitable at this stage. In 2003, the criteria for a torchlight survey to be undertaken (or use of moth traps) was altered to cover only sites with a minimum of 30 plants and/or at least 150 flowering spikes of the hostplant.

Details of the distribution and frequency of the foodplant were also noted. In the larger marsh-mallow beds it was found impossible to identify individual plants so, where appropriate (and possible), either an estimate of the number of flowering spikes or an estimate of the area covered by the foodplant was recorded.

In 2000, the population at Old Cheyne Court was monitored on two separate nights by counting moths during a one-hour torchlight search. From 2001 a

Table 1. Annual counts of *Hydreacia osseola* at Old Cheyne Court, Kent, 2000–2007

Year	Annual count	Number of transects	Notes on foodplant density, distribution and management
2000	6	–	At least 30 flowering spikes per m^2 over an area of c. 1150 m^2
2001	74	2	Distributed over a large area at differing densities. A c. 670 m stretch of foodplant, tending to follow the course of the main survey ditch, in parts only 1–3 plants deep, but beds locally spreading up to 15 m into the adjacent field.
2002	53*	4	c. 670 m stretch of foodplant. Tending to follow the course of the main survey ditch, in parts only 1–3 plants deep, but beds locally spreading up to 15 m into the adjacent field.
2003	34	3	c. 670 m stretch of foodplant, but c. 520 m heavily trampled/grazed by cattle, resulting in a reduction of the foodplant in some areas. Beds tending to follow the course of the main survey ditch, in parts only 1–3 plants deep, but these locally spreading up to 15 m into the adjacent field.
2004	17	3	c. 670 m stretch of foodplant, but with c. 130 m stretch still cattle-grazed. Foodplant in two sectors fenced off. Foodplant reduced in some areas on 2003's level. Tending to follow the course of the main survey ditch, in parts only 1–3 plants deep, but beds locally spreading up to 15 m into the adjacent field.
2005	55 (+4)**	3	c. 670 m stretch of foodplant. Significant recovery in distribution and frequency of plant noted, grazing in one sector has continued and plant virtually absent. Marsh-mallow tending to follow the course of the main survey ditch, in parts only 1–3 plants deep, but beds locally spreading up to 15 m into the adjacent field.
2006	57	3	c. 670 m stretch of foodplant. Little change from 2005, but slight increase in plants in one sector of transect.
2007	29	3	c. 540 m stretch of foodplant. Little change in three sectors, although numbers of plants reduced in 2 areas due to competition from common reed *Phragmites australis*. Within foodplant beds, the density of marsh-mallow remained significantly below pre-grazing levels. Plant tending to follow the course of the main survey ditch, in parts only 1 to 3 plants deep, but beds spreading locally up to 10 m deep.

*Only three individuals noted on the last transect.
**The figure in brackets is the total for an additional early transect undertaken in late August.

standardised transect was followed, this broken into five sectors. A high-powered torch was used and all identifiable *H. osseola* within five metres of the transect route were recorded. Each transect took about 50 minutes to walk. Monitoring did not take place if the wind speed was greater than force 3 (on the Beaufort Scale) or the temperature was below 10°C. The transect survey was generally undertaken on three occasions during each season.

Transect surveys were subsequently undertaken at Woodruff's Farm and Moneypenny Farm from 2002 and 2003, respectively. The former was divided into

three sectors (taking approximately 25 minutes to survey), the latter into five (taking approx. 45 minutes to survey). All transects were walked between 30 minutes and four hours after dusk. Usually three transects were carried out during each season.

All transects were monitored between 2–25 September, although the exact dates varied year on year, depending on weather conditions and the state of the season.

Results

Summary of results

The moth is currently considered to be established at four sites on Romney Marsh (Tables 1–4). Two of these, at Old Cheyne Court, Kent and Moneypenny Farm, East Sussex (Tables 1 & 2), can be considered as core sites, whereas the two remaining colonies, at Woodruff's Farm, Kent, and Saltbarn Ditch, East Sussex, because of the lesser amount of hostplant, must be considered more vulnerable (Tables 3 & 4). Saltbarn Ditch was identified as a site for the moth in 2006, this in the third season of surveying the site. This locality, along with the Playden record from 2006, are thought to be close to the original Houghton Green site. It is also apparent that the moth disperses widely and has been recorded, mainly as single examples, at a number of other sites. Additional data on sites in Kent and Sussex where the foodplant but not the moth occurs are given in Table 5.

Conservation

Threats

Kettlewell (1954) suggested that the species may be 'subject to heavy selective predation', such as from beetles and lizards. This may be the case, although it is clear that the Romney Marsh of the 1950s and 1960s was a different place compared with the present day, at least in respect of the marsh-mallow plant. Anecdotal reports indicate that the plant was widespread and locally common. For example, Huggins (1956) indicates that the moth inhabited 'widely spread localities' and de Worms (1956), describing a 1955 mothing excursion to the marsh, located a 'good growth' of marsh-mallow near Rye, with another marsh at Jury's Gap and a field near Appledore being 'full of the mallow'. During the mid 1960s the plant still occurred in quantity at Rye (de Worms, 1966). However, at Houghton Green, in around the mid 1960s, it had been noted that the River Board had destroyed most of the marsh-mallow nearby (Pratt, 1999) with Pratt (*loc.cit.*) stating that 'During the 1970s the plant suffered a serious fall in frequency in many places'. Bretherton, Goater & Lorimer (1983) stated that on the Marsh 'many of the best sites have been lost as a result of the spraying of the plant by local farmers', with Goodson (1956) recounting that the owner of a field had casually remarked that 'the stuff [marsh-mallow] had been *sprayed* several times to kill it'. Goodson (1956) added 'the chief enemy of the plant is the farmer, whose cattle dislike it immensely'. Waring (1996) suggested of the moth's decline that it 'appears to be due to draining and spraying by local farmers which eradicated the foodplant in many of its former haunts'. Mountford and Sheail (1989) highlighted that about 60% of the Marsh was affected by field drainage schemes between 1940 and 1980, with drainage entering a new phase in the late 1960s whereby it became feasible to drain land where ploughing had previously been exceptional.

Table 2. Annual transect counts of *Hydraecia osseola* at Moneypenny Farm, East Sussex, 2003–2007

Year	Annual count	Number of transects	Notes on foodplant density, distribution and management
2003	62	3	Foodplant growing as isolated, concentrated beds, smaller pockets of plants and fragmented belts – no estimate of the number of plants or flowering spikes made due to the wide, disjunct and varied nature of foodplant distribution.
2004	48	3	One patch of foodplant heavily sheep-grazed, but little change in its overall status.
2005	45(+6)*	3	Increased grazing damage to foodplant noted, reduced frequency of foodplant in one sector of transect, and invasion of mallow beds by thistles etc. in some parts.
2006	43	3	Grazing still in evidence, but more limited, with sheep removed from site earlier in the season.
2007	37**	3	Little change, with a slight increase in one area and more fragmentation of the distribution of plants in another area. No grazing damage evident. There was a general lack of records of *H. osseola* throughout the 2003–2007 period from one isolated sector that supported good amounts of foodplant, but growing in a damper situation than elsewhere at this site.

*The figure in brackets is the total for an additional early transect undertaken in late August.
**An additional 12 were recorded in a light-trap left overnight at the site, but not as part of the formal survey (per K. N. Alexander).

Table 3. Annual counts of *Hydraecia osseola* at Woodruff's Farm, Kent, 2001–2007

Year	Annual count	Number of transects	Notes on foodplant density, distribution and management
2001	14	–	20–30 flowering spikes per m^2 in a c. 350 m belt, 1–2 plants deep.
2002	16	4	20–30 flowering spikes per m^2 in c. 380 m belt, generally 1–3 plants deep.
2003	18	3	20–30 flowering spikes per m^2 in c. 380 m belt, generally 1–3 plants deep.
2004	16	3	c. 380 m belt, low density, with a small increase in plants on opposite bank, generally 1–3 plants deep.
2005	5	3	c. 350 m belt, more fragmented and fewer plants than in 2004, possibly due to a lower water table and increasing competition from other plants.
2006	8	3	c. 350 m belt, with a small recovery in distribution and condition of plants noted.
2007	3	3	c. 350 m belt, with an increase in the fragmentation of distribution of plants noted, these restricted to a narrow stand.

Table 4. Additional sites where *Hydraecia osseola* has been recorded from 2000 onwards

Site	*H. osseola* abundance (year and number seen)	Notes on foodplant density, distribution and management
Kent		
Lydd	2000: 1 (K. Redshaw) 2005: 1 (K. Redshaw) 2007: 1 (K. Redshaw)	Non-survey record (garden site).
Little Cheyne Court	2002: 2	2002: 50–60 plants, c. 450–500 flowering spikes. 2003: 50–60 plants, c. 450 flowering spikes.
Greatstone	2001: 1 (B. Banson)	Non-survey record (garden site).
Dymchurch	2002: 1 (D. O'Keeffe)	Non-survey record (garden site).
Dungeness	2003: 1 (D. Walker) 2005: 1 (K. Redshaw)	Non-survey records.
New Romney	2003: 1 (K. Redshaw) 2006: 1 (S. P. Clancy)	Non-survey records (garden site).
East Sussex		
Scots Float Sluice	2000: 6 2001: 1 2002: 1	Flowering spikes: 2000: c. 500. 2001: c. 400. 2002: c. 350.
North Point Sewer	2000: 1	Flowering spikes: 2000: c. 350. 2001: c. 350. 2002: c. 300.
Corkwood Farm	2005: 1	2005: c. 200 m stretches, all planted about four years previously. 2006: c. 200 m stretch, an additional c. 1000 first year plants transplanted to the site.
	2007: 3 (two being non-survey records, R. Regendanz)	2007: c. 210m stretch.
Playden	2006: 1 (J. H. Clarke)	Non-survey record.
Saltbarn Ditch		2004: 40 plants, c. 150 flowering spikes. 2005: c. 50 plants, c. 200 flowering spikes.
	2006: 3	2006: 180 m stretch, slight increase in plant frequency, 60 plants, 250 flowering spikes.
	2007: 2	2007: 170 m stretch, 300+ flowering spikes.
Pannel Valley, near Winchelsea	2007: 1 (P. Jones, per B. Banks)	Non-survey record.

High densities of sheep are detrimental to the plant. For example, at Fairfield, where the plant was widespread along ditch banks in 1984, there has been a reduction in hay-cropping since the 1970s, this combined with, until recently, consistently high densities of sheep. This has resulted in the elimination of marsh-mallow from all areas where the sheep were not excluded (B. Banks, *pers. comm.*). This problem is likely to have been more widespread. Mountford & Sheail (1989)

Table 5. Additional survey sites, with notes on the foodplant

Site	Notes on foodplant density, distribution and management and year of visit
Kent	
Newington Bridge	2000: 6 plants. 2001: a few isolated plants. 2002: a few isolated plants, more than 2001.
Bourne Bridge	2000: c. 12 plants, c. 100 flowering spikes, most of ditch clear-dredged. 2001: c. 15 plants, c. 125 flowering spikes. 2002: c. 150 flowering spikes.
Opposite Bentley Bridge	2000: 5 to 6 plants, c. 80 flowering spikes. 2001: 5 plants, c. 60 flowering spikes. 2002: 5 plants, c. 50 flowering spikes.
Shirley Moor	2000: c. 250 flowering spikes (at low density over a wide area). 2001: 200–250 flowering spikes. 2002: c. 25 plants, 250+ flowering spikes.
Saxon Shore Way	2000: at least 400 flowering spikes (at low density over a wide area). 2001: c. 350 flowering spikes. 2002: 320+ flowering spikes.
Burmarsh	2000: c. 20 plant, c.200+ flowering spikes. 2001: c. 40plants, 300+ flowering spikes. 2002: c. 40plants, 300+ flowering spikes. 2003: c. 40plants, 250+ flowering spikes.
Newchurch	2000: none. 2001: 4 plants.
Lower Wall Farm	2001: c. 140m stretch of foodplant. 2002: c. 160m stretch of foodplant. 2003: c. 140m stretch of foodplant. 2004: c. 140m stretch of foodplant.
Appledore	2001: 30+ plants. 2002: 30+ plants, 200+ flowering spikes.
Lydd Ranges	2003: c. 330 flowering spikes growing along the inland bank of the sea-wall.
Highknock Channel at Stone Bridge	2004: none.
Five Watering Sluice at Becket's Bridge	2004: none.
East Susssex	
Rye Harbour Road	2000: c. 150 flowering spikes.
Brede Sluice	2004: 6–8 plants.
Houghton Green field	2004: 3–4 plants (a traditional area for the moth in the 1950s/60s that had apparently been drained and used as farmland, now unsuitable).

(Continued)

Table 5. (Continued)

Site	Notes on foodplant density, distribution and management and year of visit
East Sussex *(Continued)*	
Rye Harbour NR	2005: both naturally occurring and introduced plants on various sites on the reserve, no count. 2006: a total of c. 120 flowering spikes at two locations on the Reserve.
Ham Green ditch	2007: 90–100 flowering spikes in a 30 m stretch.
River Rother within 1 km of Blackwall Bridge	2007: No significant stands of foodplant noted, occasional plants only.
East Sussex/Kent	
Royal Military Canal	2001: Occasional isolated plants, long stretches heavily grazed and unsuitable. 2002: Occasional isolated plants. 2005: Isolated plants over 1.5 km stretch (Kent section only surveyed).

reported that in 1940 approximately 180,000 sheep grazed 85% of Romney Marsh, by 1980 this figure had fallen to 108,000 sheep, but these grazed 35% of the marsh, a substantial increase in the stocking rate, but over a smaller area of grassland.

Whatever the reasons for the plant's decline, it is clear that many of the best-known sites for the moth in the 1950s and 1960s now no longer support extensive stands of its hostplant, marsh-mallow. These include the Royal Military Canal and Jury's Gap.

During the course of the project, threats to the plant and moth encountered have included:

- Clear-dredging of ditches and dumping on to the ditch bank, with evidence at some sites that plants had been uprooted.
- Cutting down of plants, as a result of mowing or ploughing of fields.
- Shading by tree and scrub growth along ditch edges, thus reducing the amount of potentially suitable habitat in some places.
- Competition from plants such as common reed and bulrushes *Typha* spp. (in wetter conditions), and thistles and grasses (in drier conditions), exacerbated by fluctuations in water levels.
- Inappropriate grazing and trampling by cattle and/or sheep impacting on the density and distribution of the foodplant, and allowing the invasion of the foodplant beds by other plant species such as rushes *Juncus* spp. and club-rushes.

A lack of grazing on some suitable sites may also be detrimental as this could, in the longer term, lead to invasion by unfavourable plant species, which in turn could result in the slow decline of marsh-mallow populations.

Low numbers of *H. osseola* were recorded at Moneypenny Farm, Old Cheyne Court and Woodruff's Farm in 2007 and it is possible that these counts are a reflection of the wet conditions encountered during the May to August period. Although the foodplant is generally a marginal plant, often occurring in surprisingly dry conditions, the wetter conditions could have resulted in higher larval mortality in damper parts of the colonies. However, the larval tolerance to substrate moisture

levels is not known, but the apparent absence of a breeding population within foodplants growing in consistently damp conditions in one sector of the Moneypenny transect suggests an intolerance of prolonged wet conditions during the subterranean life-cycle stages.

Management

At Old Cheyne Court in 2003 severe damage to the foodplant occurred by overgrazing from cattle. The following spring a site meeting was held between the second author, English Nature and the site manager. As a result of this meeting, areas of marsh-mallow were fenced off, although some were still left un-protected. By 2004, colonisation by sea club-rush *Bolboschoenus maritimus* (L.) had occurred and the marsh-mallow, which formerly occurred in dense stands, was distributed as fragmented patches. In this year there was a significant drop in the number of *H. osseola* recorded. There was a steady recovery, both in the distribution of the hostplant and the moth, during 2005 and 2006, although by 2007 the plant had still not regained its pre-2003 density or distribution at the site and in two sectors of the transect common reed was spreading.

At Moneypenny Farm there has been a long-term practice (since the mid 1980s) of not grazing during the summer months, resulting in good stands of the hostplant. Low stocking rates led to one area of marsh mallow becoming shaded by willow scrub, this has been addressed by the removal of trees over the last 10 years (B. Banks, *pers. comm.*). Grazing issues and scrub encroachment were discussed in 2002 with English Nature. This led to the site being monitored as part of the project from 2003 onwards. At the time, advice was given to allow livestock in for a period of time in late summer, while larvae were feeding in the rootstock of marsh-mallow, and again over the winter. The site often suffers from localised flooding from late October onwards, making areas difficult to access by livestock, thereby affording some protection to the over-wintering eggs. Whilst not ideal, the need to restrict scrub incursion through grazing was considered to be of over-riding importance. There was an increase in grazing noted in 2005, this combined with drier conditions in that year. In 2006, grazing was reduced and the animals were removed earlier in the season. Sheep-grazing at the site is likely to continue as an issue from time to time and damage to the foodplant stands, such as reduced density of plants and denudation of the foliage still occurs over parts of the site, although none was noted in 2007. In 2005 it was noted that hay-bales had been stacked on one part of the site, and following advice from the second author to English Nature this practice has been discontinued.

At Woodruff's Farm a temporary electric fence has been in use, in conjunction with winter grazing, to encourage marsh-mallow to reinvade the side of a ditch bank. The process has been slow, but plant numbers have risen from zero ten years ago to about 20 large plants in 2007 (B. Banks, *pers. comm.*).

The moth does seem to have the capability to colonise areas as they become suitable. It is evidently a mobile species as there have been a number of reports of the species away from suitable habitat over Romney Marsh. Woodruff's Farm and Saltbarn Ditch would appear to be recent colonisations, as the marsh-mallow plants here appear to be young and developing, and several unsuccessful surveys for the moth were carried out at both sites prior to its detection. Consequently, possibly the most exciting recent developments have been attempts at creating extensive marsh-mallow stands, most notably at Corkwood Farm, near Iden, East Sussex. This was initially undertaken independently of the project by the land-owner, although a subsequent meeting with the land-owner led to the further addition of significant

quantities of foodplant and the establishment of a torchlight transect here. At this site existing vegetation was first killed with 'Round-Up' herbicide and the young marsh-mallow plants within fibre pots were densely planted into the bare ground, this method resulting in very few losses. There is now a 200 m stretch of older marsh-mallow plants, with c.1000 additional first-year plants being planted into a concentrated area in 2006. Those from the original planting are now between four and six years of age, with the moth occurring naturally on the site in 2005 and 2007. Although it cannot definitely be stated that the moth has colonised the area, there is clearly potential for it to do so. Continued monitoring of the site is planned, with the hope of dating any colonisation, establishing the size, growth and distribution of any future moth population at the site, and identifying the age and condition of the foodplant beds able to support the moth.

Planting of marsh-mallow is also occurring at various sites on Rye Harbour Nature Reserve, supplementing existing plants. Following a site meeting with the Reserve Warden, Barry Yates, in 2005, 50 plants were planted in September 2006 into an area that already held a few, sparsely occurring plants. Currently these are considered to be too few to sustain a long-term population of the moth, however, it is hoped that additional planting will take place and that this will be at a higher density than has been undertaken to date.

The moth was recorded on a private nature reserve at Pannel Valley, near Wittersham, East Sussex, in 2007. There are now three patches of marsh-mallow, the largest consisting of 40–50 flowering spikes and it is currently unlikely the moth is resident here. Encouragingly however, there are plans to artificially increase the number of marsh-mallow plants at the site (Ian Hunter, *pers. comm.*), and site meetings are planned for 2008 to discuss the foodplant frequency and situation likely to be required for colonisation of this site by the moth.

The Site of Special Scientific Interest and Agri-environment Schemes

The Dungeness, Romney Marsh and Rye Bay SSSI was re-notified in 2006. At least three of the moth's populations are within the SSSI boundary, with the remaining colony near the border. Two further areas, where there is currently potential for expanding habitat, are also both within the SSSI. The moth itself is also mentioned on the citation for the SSSI as occurring on Walland Marsh (part of Romney Marsh).

The current relevant targeting statement for Higher Level Stewardship, the Joint Character Area (JCA) for Romney Marsh (JCA123) (see *www.defra.gov.uk*), includes "Maintain and, where possible, increase the populations and range of UK BAP Priority Species which have been identified in your FEP [Farm Environment Plans]". These plans (FEPs) involve identifying features of historical, wildlife, resource protection, access and landscape context, and make an assessment of their condition, which in turn will help to determine a suitable level of management achievable through Higher Level Stewardship. Moneypenny Farm is currently under a Higher Level Stewardship agreement, which includes a target for the marsh-mallow plant (a surrogate for the moth). The aim here is to enhance the population of the plant (M. Oliver, *pers. comm.*).

Suggested minimum requirements for *H. osseola*

As the larvae of the moth are root-feeders, significant stands of marsh-mallow are required to support a population of the moth. Based on survey results a bare minimum of 100 plants or 300 flowering spikes is likely to be necessary to establish

anything other than a temporary, unsustainable colony. The moth fares better in drier conditions (i.e. not damp underfoot during the summer months) where the plant grows in dense, largely single-species beds and this should be the aim of any artificial establishment. However, competition from other plant species can become a problem in drier localities, so artificial foodplant introductions in these areas may require some sward preparation followed by tightly spaced planting. It is likely that in order to have the amount of rootstock required to support the larvae, plants would need to be four to five years old before colonisation would be successful.

As a result of this project the following criteria can be considered reasonable proof of residency at an individual site holding suitable habitat:

i. Adults recorded at rest on the foodplant for three successive years.
ii. Three or more adults recorded at rest on the foodplant on a single visit.
iii. A freshly-emerged adult at rest on or in the vicinity of the foodplant (wings not fully dried).
iv. An ovipositing female on or in the vicinity of the foodplant.
v. A pair *in copula* on or in the vicinity of the foodplant.

Collecting

From early reports it is evident that many specimens were collected, and it is apparent that many larvae and pupae were also dug up, although the hostplants were probably not completely destroyed and grew again from old rootstock. Despite this, the moth continued to prosper until the hostplant itself declined over the Marsh.

All the existing colonies are on private land, and three of the four lie within the Dungeness, Romney Marsh and Rye Bay SSSI. In these cases, permission will be needed from both Natural England and the owner to visit the site for the moth. Given the species' current status, restraint is urged and recorders are currently discouraged from visiting the key sites on the Marsh. If many people visit these sites it could alienate the relevant site manager/landowner, which could in turn have a detrimental effect on the moth.

Recorders are urged to send unsubmitted or future records of the moth to either of the authors for inclusion in future annual reports.

Conclusions

Romney Marsh has changed markedly over the last half century: the greater pressure on land use, modern farming practices, increased sheep-grazing coupled with a decline in hay cropping, more efficient ditch management and land drainage, and increased use of herbicides have all led to a drastic reduction in the frequency and distribution of marsh-mallow. Anecdotal information indicates that the plant was formerly far more widespread over the area, and occurred in large stands. The moth was also more widespread, at least during the 1950s and 1960s, and was possibly more widespread on parts of the Marsh than the records suggest. The plant is now much less frequent and more local, tending to occur as scattered or isolated plants, with the moth currently considered to be resident on just four sites on Romney Marsh, and healthy populations at just two of these. Regular monitoring of the key sites has been beneficial, not only to ascertain how these populations are faring, but also to identify any changes in management which may be detrimental to the hostplant and the moth. This survey and monitoring effort has also provided an insight into the requirements of the species which can be used to guide conservation effort.

Resources are an issue. Much of the project covers survey and monitoring, as well as producing and circulating an annual report to relevant parties. Liaison with the relevant organisations and individuals takes time. Currently much of this goes through Natural England, although there is scope for much wider liaison. Staff at Natural England (and its predecessor English Nature) have spent many years liaising with land owners and site managers about conservation issues on Romney Marsh, with *H. osseola* as well as other species in mind. Farmers will continue to graze areas on the Marsh, and liaison will be needed to ensure this grazing is at an appropriate level and time on a site by site basis. Fencing may be needed to protect stands of the hostplant in a few instances, but care will be needed to avoid competition from other plant species in the longer term, so this is likely to be only a temporary measure in some places. Of prime importance is the need to establish further stands of marsh-mallow to increase potential habitat, and by way of insurance should anything untoward happen to the existing sites. Some planting is occurring, but, with the exception of one site, this is still relatively low-key. For this to be expanded more plants need to be grown on and then planted out. Agri-environment schemes may be of benefit in enhancing this. A meeting of interested parties to discuss the way forward is planned for 2008.

Although only comparatively recently discovered in this country, given its restricted distribution abroad, the populations of *H. osseola* in England are clearly not just of UK significance, but also of international importance. Whilst conservation efforts are happening at the local level, any wider environmental change in the area of Romney Marsh that has an impact on the success of the hostplant will obviously have an impact on the moth as well. Parsons (2001) identified *H. osseola* as a European priority for conservation, suggesting that the UK had a "significant international responsibility" for the species' conservation; this continues to be the case.

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FIRST BRITISH OUTBREAK OF *KERMES VERMILIO* PLANCHON (HEMIPTERA: KERMESIDAE), A MEDITERRANEAN PEST OF EVERGREEN OAKS

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ABSTRACT

Kermes vermilio Planchon (Hemiptera: Kermesidae), a pest of evergreen oaks, is reported damaging *Quercus ilex* trees in London, England. The trees had been imported from Italy approximately five years previously. This is the first record of this pest in Britain and action is being taken to control it. The host range, biology, geographical distribution and economic importance of *K. vermilio* are reviewed.

INTRODUCTION

Yellowing of the foliage and dieback of apical stems was first noticed occurring on about seven *Quercus ilex* L. (Fagaceae) trees grown in a sheltered garden at a nursing home in Battersea, London, during the summer of 2007. A member of the public (David Milane), collected a sample of twigs and leaves in August and submitted them to the Royal Horticultural Society (RHS) for diagnosis. The RHS principal entomologist, Andrew Halstead, forwarded the sample to the Central Science Laboratory (CSL), where the pest was identified as *Kermes vermilio* Planchon. This species is commonly known as the 'berry kermes', as the adult females resemble berries (Fig. 1) and one of its hosts is the kermes oak (*Quercus coccifera* L.). The infested trees in Battersea had been imported from Italy approximately five years previously. The purpose of this communication is to publish collection details and review the host range, biology, geographical distribution and economic importance of *K. vermilio*.

Fig. 1. Adult female *Kermes vermilio* on *Quercus ilex*.

Slide-mounted specimens from this sample of *K. vermilio* have been deposited at the CSL (20714803) and the Natural History Museum, London (BMNH). Dry specimens have also been stored at the CSL.

Detection and identification

Kermes vermilio is a relatively small and inconspicuous insect and its presence is likely to be first detected by its feeding damage. It can cause conspicuous, patchy, yellowing of the leaves, drying out of the apical stems and leaf loss. Adult females are sessile, almost spherical, reddish brown, covered in a grey-white dusting of wax and sit on a circular white wax pad; they attain a maximum diameter of 4 mm. The first- and second-nymphal instars are bright red. Male nymphs form a white wax test on the undersides of the leaves or on apical twigs. The adult male, typically for a scale insect species, bears a single pair of wings and resembles a small fly.

Adult females are usually required for identification and are described in detail by Leonardi (1920) and illustrated by Borchsenius (1960, as *Kermococcus vermilio* (Planchon)). Diagnostic keys are provided by Borchsenius (1960) and Bodenheimer (1953). Balachowsky (1950) provided a key to first instar larvae of *Kermes* species found in Europe and the Mediterranean; it is particularly useful if adult female specimens are too heavily sclerotised for identification purposes. Martín Bernal *et al.* (2002) published colour photographs of the damage caused, and of adult male and females.

Adult female *K. vermilio* may be distinguished from the three native British species of *Kermes* (*K. quercus* (L.), *K. roboris* (Fourcroy) and *K. williamsi* Sternlicht), by the absence of legs, which are present in the other species. *Kermes vermilio* is only recorded feeding on evergreen oaks (see below), whereas the native species usually feed on deciduous oaks; however, *K. roboris* has been recorded on *Q. ilex* once (Longo *et al.*, 1991).

Host plants, biology and natural enemies

Kermes vermilio has one generation a year, is oviparous and overwinters as first instar nymphs (Marotta *et al.*, 1999). Each female lays an average of 2000 eggs (Leonardi, 1920). In Italy the nymphs appear in late May and early June, although in Battersea the first instars were observed in August. They are very active for two or three days, before settling to feed, giving preference to young branches. *Kermes vermilio* feeds on the evergreen oaks, *Quercus coccifera, Q. ilex* and *Q. suber* L. (Hoy, 1963).

Population levels are usually kept in check by a complex of natural enemies including the following:

Coleoptera

Coccinellidae: *Brumus quadripustulatus* (L.) (= *Exochomus quadripustulatus* (L.)) (Belcari & Minnocci, 1989).

Hymenoptera

Encyrtidae: *Cheiloneurus claviger* Thomson (Del Bene & Landi, 1992); *Encyrtus infidus* (Rossi) (= *Encyrtus scutellatus* Swederus and *Eucomys scutellatus* (Swederus)) (Lepiney, 1928; Trjapitsin, 1957); *Metanotalia maderensis* (Walker) (= *Aenasioidea hispanica* (Mercet)) (Fulmek, 1943) and *Metaphycus hirtipennis* (Mercet) (Fulmek, 1943).

Pteromalidae: *Pachyneuron muscarum* (L.) (Del Bene & Landi, 1992).

All of these control agents are present in Britain except *Metanotalia hirtipennis* and *Metaphycus maderensis*. The highest levels of parasitism (37%) of *K. vermilio* recorded in Tuscany occurred in May and June (Del Bene & Landi, 1992).

Geographical distribution

Kermes vermilio is native to the Mediterranean Region and has been recorded previously from Algeria (Hoy, 1963), France (including Corsica) (Hoy, 1963; Foldi, 2001), Greece (including Crete) (Hoy, 1963; Argyriou, 1983), Italy (including Sardinia and Sicily) (Del Bene & Landi, 1992; Longo *et al.*, 1995; Pellizzari & Fontana, 1996), Morocco (Hoy, 1963), Portugal (Silva, de M. & Carmona, 1988), Spain (Hoy, 1963) and Turkey (Hoy, 1963).

It is possible that *K. vermilio* is more widespread within southern England than is currently known, since large numbers of *Q. ilex* are imported from the Mediterranean. This host is commonly planted as an ornamental in parks and gardens and has become naturalised in southern Britain. Furthermore, climate change may enable *Q. ilex* to establish more widely within the UK.

Economic importance

Kermes vermilio is a pest of *Q. ilex*, particularly in urban environments in Italy (Belcari & Minnocci, 1989) and Spain (Martín Bernal *et al.*, 2002). The insects debilitate the host plants by feeding on the sap. Large populations cause conspicuous yellowing of the leaves, leaf loss, drying out of the apical stems and dieback. Occasionally the trees will suffer complete leaf loss (Martín Bernal *et al.*, 2002), although mature, healthy trees will recover.

Historical importance

Kermes vermilio was one of two species that were an important source of red dye for textiles in Asia and Europe (Wouters, 1990), with the peak in oak kermes dye use extending from the 12th century to the 16th century. Kermes dye was often part of the tribute paid to conquering Roman armies, and, in the Middle Ages, landlords accepted it as payment for rent (Encyclopædia Britannica, 2007). It may also have been used in prehistoric times, as kermes-dyed remains have been identified at a prehistoric archaeological site in Provence, France (Donkin, 1977). In ancient times, these insects were thought to be of a vegetable nature, and were also used in medicines.

Conclusions

Kermes vermilio is a pest of evergreen oaks, particularly *Q. ilex* in urban areas. A large population has been found on several trees in London (close to Battersea Park) and it is likely that the pest has been present outdoors for at least five years. Action is being taken to control this insect, as this is the first time that this non-native plant pest has been found in Britain. Eradication of *K. vermilio* from the UK, however, will be difficult, as it is present on relatively large woody plants growing on private premises and there are few, if any, fully effective chemical control products available for such situations. The free movement of the host plants within the European Union also means that this species is likely to be continually imported from the Mediterranean and if climatic conditions allow, to naturalise in Britain.

Suspected outbreaks, or interceptions, of non-native plant pests should be reported to the local Defra PHSI office or to the PHSI HQ, York (Tel.: 01904 455174, Fax: 01904 455197).

Acknowledgements

David Milane provided details of the original infestation of *K. vermilio* in Battersea. The referees, Dr Gillian Watson of the California Department of Food & Agriculture and Dr Jon Martin of the Natural History Museum, London provided some very useful and interesting comments on the manuscript. This work was funded by the Plant Health Division, Defra, and carried out under Licence Number PLH251B/5328 (02/2006), amended (04/2006).

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BOOK REVIEW

The Land and Freshwater Bugs (Hemiptera) of Cornwall & the Isles of Scilly by Keith Alexander. CISFBR & ERCCIS Occasional Publication No. 2, 2008. 155 pp. Softback, A4 spiral bound. ISBN 0 9534613 2 7. £8 + £2 p&p payable to CISFBR from either Colin French, 12 Seton Gardens, Weeth Road, Cambourne, Cornwall TR14 7JS, or Gary Lewis, ERCCIS, Five Acres, Allet, Truro TR4 9DJ.

The bulk of this publication (133 pages) is a list of known records of the bugs recorded in Cornwall and the Isles of Scilly (Watsonian Vice Counties 1 and 2). Species are listed systematically and each has a brief summary of one or two sentences on its ecology; these are often generalised statements for Britain but are sometimes tailored to the ecological peculiarities in Cornwall and the Isles of Scilly. This is followed by a list of the records for each tetrad which are grouped by 100 km square. Details for each record are locality, date, recorder, date of the publication where the record was published (if relevant) and occasional additional notes about the record. Statuses are given at national and county level, the former being those published by the Joint Nature Conservation Committee's 1992 review of Hemiptera, and the county rare and scarce statuses being defined by number of sites in Cornwall and the Isles of Scilly or decline since 1950. All the Hemiptera are covered but the data are sparse for less well-recorded groups such as aphids and whitefly, and the author acknowledges that records for the sub-Order Homoptera were included for the sake of completeness. The records were derived principally from those collated by the county records centre and from Keith Alexander's own recording and literature searches. The level of recording is rather low, as indicated by Keith's records contributing about a quarter of conspicuous common species, such as *Capsus ater* and *Pithanus maerkeli*, that even non-specialists such as myself would note. About 150 references are given in the bibliography; the index of binomials refers to the record entries but not to names in the introductory text.

Among the eight pages of introductory text are discussions of the special features of the Cornish fauna, changing distributions and the numbers of species in each major taxon. These sections highlight some of the rare Mediterranean and Atlantic species confined to the area or are rare outside of it. The habitats of greatest value to the bug fauna are also probably geographically restricted, notably freely draining dry soils of sea cliffs and wind-blown sand. Some nationally rare species are local specialities, but conversely some 'common' species are particularly scarce or even absent here, for example bugs associated with birch. One of the striking changes noted was the scarcity of older records for bugs associated with tall and coarse grasses and nettles, which are now common plants in Cornwall encouraged by agricultural nutrient-enrichment.

There are short sections on equipment needed for fieldwork, retaining voucher specimens and why this is necessary for this group, some of the more useful literature

and addresses of the three national recorders that deal with water bugs, land bugs and hoppers as well as Keith's for Cornish records. The literature omits the recent and (to me) indispensable *Die Zikaden Deutschlands* by Robert Beidermann and Rolf Niedringhaus (2004) that makes hoppers a cinch to identify without having to read a word of German. The classic Southwood & Leston is available on CD from a well known supplier at a lower cost than a second-hand book.

The document is well produced on good paper and in 12 point type-face so it's clear to read. The spiral binding, although covered when the book is closed by a floppy wrap-around cover, seems unnecessary for a book that will probably not get opened many times, but perhaps is cheaper than a good binding.

I have a few problems with this publication. The introduction says that the format was pioneered by Andrew Duff in his *Beetles of Somerset*, but that was in 1993 when records could not be obtained instantly as they can today from the NBN Gateway. I have moderate Luddite tendencies myself and view computers as an unwelcome but indispensable tool, but I do wonder why we have a paper version of records that have been downloaded from the mighty computer and, for most practical purposes, made unsearchable except by species name. There are no useful site lists. The series by the Surrey Wildlife Trust takes a similar approach but makes more appealing publications by including dot maps so that patterns and distributions are immediately apparent, sometimes quite extensive accounts for each species and, perhaps most importantly, detailed discussion about factors such as geology that influence distributions within the county. The dry lists of records in Bugs of Cornwall would have been a little more easy to interpret had the book included a few maps showing the solid geology, key habitats and the 100 km squares.

There are no summary tables that would have made the work more instantly accessible to both specialists and the general reader. For instance, three of the most interesting sections of text that discuss special features of the Cornish fauna, changing distributions and species totals could have been expanded by listing or tabulating more species to illustrate the points being made. A list of the county's rare and scarce species would have made a useful little table; instead, you have to flick through 133 pages to find them. Ironically, the only list is of nine species that are apparently absent from the area.

It takes a lot of space and paper. The typeface could have been shrunk, or a different approach taken to common and widespread species, which have most records but are of least intrinsic value, such as just saying 'common and widespread'. It is only for scarcer species that individual records give genuinely useful information or inspire other specialists to hunt further.

The publishers have missed a trick: the initials CISFBR (Cornwall and Isles of Scilly Federation of Biological Recorders) are nowhere explained, and ERCCIS (Environmental Records Centre of Cornwall and the Isles of Scilly) appears in full once, buried in the text near the bottom of the page 7, together with reference to the Cornwall Biological Records Unit that is presumably not a synonym of CISFBR. This is their second Occasional Publication – why don't they say what the first was? I suppose the book is missing a preface where these things could be said.

But if you are a hemipterist that likes to curl up in front of the fire with a book, this is the one for you.

MARTIN DRAKE

EUROPEAN COMMUNITY LEGISLATION – HABITATS DIRECTIVE: ADVICE ON THE INTEGRATION OF NEW LEGAL RESTRICTIONS AFFECTING INVERTEBRATES

Introduction

Within Europe natural habitats are continuing to deteriorate and an increasing number of wild species are seriously threatened; much of this is as a result of development and agricultural intensification. The main aim of the EC Habitats Directive is to promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species at a favourable conservation status, introducing robust protection for those habitats and species of European importance. In applying these measures Member States are required to take account of economic, social and cultural requirements and regional and local characteristics.

In 1992 the European Community adopted Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive). This is the means by which the Community meets its obligations as a signatory of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). The Directive applies to the UK and to its overseas territory of Gibraltar. The provisions of the Directive require Member States to introduce a range of measures including the protection of species listed in the Annexes, to undertake surveillance of habitats and species, and produce a report every six years on the implementation of the Directive. The 189 habitats listed in Annex I of the Directive and the 788 species listed in Annex II, are to be protected by means of a network of sites. Each Member State is required to prepare and propose a national list of sites for evaluation in order to form a European network of Sites of Community Importance (SCIs). Once adopted these sites are designated by Member States as Special Areas of Conservation (SACs) and along with Special Protection Areas (SPAs) classified under the EC Birds Directive, form a network of protected areas known as Natura 2000.

In the UK the Directive has been transposed into national law by means of the Conservation (Natural Habitats, etc.) Regulations 1994, as subsequently amended in 1997, which came into force on 30 October 1994. These are known as 'the Habitats Regulations', containing five parts and four Schedules, the Regulations provide for the designation and protection of 'European sites', the protection of 'European protected species' and the adaptation of planning and other controls for the protection of European Sites.

Under the Regulations, competent authorities i.e. any Minister, government departments, public bodies, or persons holding public office, have a general duty in the exercise of any of their functions to have due regard to the EC Habitats Directive. Included within the Directive is Annex IVa, in which Member States are required to take requisite measures to establish a system of strict protection of specific animal species so listed.

Buglife – The Invertebrate Conservation Trust recently drew the Government's attention to the fact that apparently the UK had not fully implemented parts of the Directive, including Annex IVa, which covers the Invertebrates; this our Authorities were subsequently ordered to rectify. As a consequence an amendment to the 1994 Directive, The Conservation (Natural Habitats etc) (Amendment) Regulations 2007 was implemented, coming into effect on 21 August 2007, thus making it illegal in the

UK to possess, or offer for sale, specimens of the listed species taken from the wild within an EC Country after the date of the original Directive or on the date of a member subsequently joining the EC.

The impact of the current legislation is dependent upon the European territory of the Member State in which the specimen was taken from the wild, together with the date of the implementation of the Habitats Directive within that specific Member State.

As far as the UK is concerned the relevant date should be taken as 10 June 1994, the date that the Directive came into force within the EC, Directives automatically come into effect two years after adoption and not 30 October 1994 when the Directive was transposed into domestic law or 21 August 2007, the date when the Amendments to the Regulations were enacted by UK, which included Annex IV(a).

For many EC countries the relevant date is also 10 June 1994, or for more recent accession countries the date on which they joined the EC.

To summarize the above: it is thus unlawful in the UK to possess, transport, sell or exchange any Annex IV(a) specimen taken from the wild after 10 June 1994 without contravention of the above laws, unless holding an appropriate licence and subject to the additional provisions of the Wildlife & Countryside Act 1981; this date also applies in most current EC member states however if the State in which the specimen was taken joined the EC after that date, on the date when the member state became a member of the community.

It is however lawful to possess, transport, sell or exchange any Annex IV(a) specimen taken from the wild outside the EC.

The presumption has been retained that in any proceedings for an offence, the animal or plant in question has been taken from the wild; it is up to the defendant to show that the specimen did not originate from the wild (e.g. was captive bred or cultivated).

Whilst as a fundamental principle of English criminal law, the defendant is presumed innocent until proved guilty and which is enshrined in the Human Rights Act 1998, in the regulatory sphere "reverse burdens of proof" have been upheld by the courts as compatible with Article 6.

Thus, in connection with Annex IV species, it will be the responsibility of the defendant to show that the "lawfully taken" defence applies.

EC Habitats directive

Protection of Species – Article 12

1. Member States shall take the requisite measures to establish a system of strict protection for the animal species listed in Annex IV (a) in their natural range prohibiting:

(a) all forms of deliberate capture or killing of specimens of those species in the wild;
(b) deliberate disturbance of these species, particularly during the period of breeding, rearing, hibernation and migration;
(c) deliberate destruction or taking of eggs from the wild;
(d) deterioration or destruction of breeding sites or resting places.

2. For these species Member States shall prohibit the keeping, transport and sale or exchange, and offering for sale or exchange, of specimens taken from the wild, except for those taken legally before this Directive is implemented.

3. The prohibition referred to in paragraph 1 (a) and (b) and paragraph 2 shall apply to all stages of life of the animals to which this Article applies.

4. Member States shall establish a system to monitor the incidental capture and killing of the animal species listed in Annex IV (a). In the light of the information gathered, Member States shall take further research or conservation measures as required to ensure that incidental capture and killing does not have a significant negative impact on the species concerned.

Annex IV (a) – invertebrates

ARTHROPODS

CRUSTACEA

Isopoda

Armadillidium ghardalamensis	Ghar Dalam Woodlouse

INSECTA

Coleoptera

Bolbelasmus unicornis	
Buprestis splendens	Goldstreifiger
Carabus hampei	
Carabus hungaricus	
Carabus olympiae	
Carabus variolosus	
Carabus zawadszkii	
Cerambyx cerdo	Cerambyx Longhorn
Cucujus cinnabarinus	
Dorcadion fulvum cervae	
Duvalius gebhardti	
Duvalius hungaricus	
Dytiscus latissimus	
Graphoderus bilineatus	
Leptodirus hochenwarti	
Pilemia tigrina	
Osmoderma eremita	Hermit Beetle
Phryganophilus ruficollis	False Darkling Beetle
Probaticus subrugosus	
Propomacrus cypriacus	
Pseudogaurotina excellens	
Pseudoseriscius cameroni	
Pytho kolwensis	
Rosalia alpina	Rosalia Longcorn

Lepidoptera

Aptura metis	Freyer's Purple Emperor
Arytrura musculus	
Catopta thrips	
Chondrosoma fiduciarium	
Coenonympha hero	Scarce Heath
Coenonympha oedippus	False Ringlet
Colias myrmidone	Danube Clouded Yellow
Cucullia mixta	
Dioszeghyana schmidtii	

Erannis ankeraria	
Erebia calcaria	Lorkovic's Brassy Ringlet
Erebia christi	Raetzer's Ringlet
Erebia sudetica	Sudeten Ringlet
Eriogaster catax	
Fabriciana elisa	Corsican Fritillary
Glyphipterix loricatella	
Gortyna borelii lunata	Fisher's Estuarine Moth
Hypodryas maturna	Scarce Fritillary
Hyles hippophaes	Seathorn Hawk-Moth
Leptidea morsei	Fenton's Wood White
Lignyoptera fumidaria	
Lopinga achine	Woodland Brown
Lycaena dispar	Large Copper
Lycaena helle	Violet Copper
Maculinea arion	Large Blue
Maculinea nausithous	Dusky Large Blue
Maculinea teleius	Scarce Large Blue
Melanargia arge	Italian Marbled White
Nymphalis vau-album	False Comma
Papilio alexanor	Southern Swallowtail
Papilio hospiton	Corsican Swallowtail
Parnassius apollo	Apollo
Parnassius mnemosyne	Clouded Apollo
Phyllometra culminaria	
Plebicula golgus	Nevada Blue
Polymixis rufocincta isolata	
Polyommatus eroides	False Eros Blue
Proserpinus proserpina	Willowherb Hawk-Moth
Pseudophilotes bavius	Bavius Blue
Xylomoia strix	
Zerynthia polyxena	Southern Festoon
Mantodea	
Apteromantis aptera	Praying Mantis
Odonata	
Aeshna viridis	Green Hawker
Cordulegaster heros	Large Golden-Ringed Dragonfly
Cordulegaster trinacriae	Italian Goldenring
Gomphus graslinii	
Leucorrhinia albifrons	Eastern White-faced Darter
Leucorrhinia caudalis	Bulbous White-faced Darter
Leucorrhinia pectoralis	Large White-faced Darter
Lindenia tetraphylla	
Macromia splendens	Shining Macromia Dragonfly
Ophiogomphus cecilia	Green Clubtail
Oxygastra curtisii	Orange-spotted Emerald
Stylurus flavipes	
Sympecma braueri	

Orthoptera

Baetica ustulata	
Brachytrupes megacephalus	
Isophya costata	
Isophya harzi	
Isophya stysi	
Myrmecophilus baronii	
Odontopodisma rubripes	
Paracaloptenus caloptenoides	
Pholidoptera transsylvanica	
Saga pedo	Predatory Bush Cricket
Stenobothrus eurasius	

ARACHNIDA

Araneae

Macrothele calpeiana	Gibraltar Funnel-web Spider

MOLLUSCS

GASTROPODA

Anisus vorticulus	Lesser Whirlpool Ram's-horn Snail
Caseolus calculus	Madeiran Land Snail
Caseolus commixta	
Caseolus sphaerula	
Chilostoma banaticum	
Discula leacockiana	Madeiran Land Snail
Discula tabellata	Madeiran Land Snail
Discula testudinalis	Madeiran Land Snail
Discula turricula	
Discus defloratus	
Discus guerinianus	Madeiran Land Snail
Elona quimperiana	Escargot de Quimper
Geomalacus maculosus	Kerry Slug
Geomitra moniziana	Madeiran Land Snail
Gibbula nivosa	Maltese Topshell
Hygromia kovacsi	
Idiomela (Helix) subplicata	
Lampedusa imitatrix	Filfla Door-Snail
Lampedusa melitensis	Maltese Door-snail
Leiostyla abbreviata	Madeiran Land Snail
Leiostyla cassida	Madeiran Land Snail
Leiostyla corneocostata	Madeiran Land Snail
Leiostyla gibba	Madeiran Land Snail
Leiostyla lamellosa	Madeiran Land Snail
Paladilhia hungarica	
Patella ferruginea	Ribbed Mediterranean Limpet
Sadleriana pannonica	
Theodoxus prevostianus	
Theodoxus transversalis	

BIVALVIA

Lithophaga lithophaga	European Date Mussel
Pinna nobilis	Pen Shell
Margaritifera auricularia	Spengler's Freshwater Mussel
Unio crassus	Thick-shelled River Mussel
Congeria kusceri	

ECHINODERMS

ECHINOIDEA

Centrostephanus longispinus

Comment

Observers may well be critical as to why a so-called Habitats Directive should concern itself at all with Species Protection. Most informed sources would agree that the protection of individual species has minimal effect upon the viability and conservation of species in the wild, and that far greater emphasis should and must be placed upon the protection of habitats from the ever-increasing march of so-called civilization.

The restrictions are probably well-intentioned and designed to benefit wild populations of the species concerned, however, there is currently little evidence to show that significant benefits actually occur.

The above list covers approximately 130 species of invertebrates which are classed and considered to be in need of strict protection in Europe; only four of these are currently listed under Schedule 5 of the Wildlife and Countryside Act 1981 and are (or were) native to UK namely *Lycaena dispar* (Large Copper), *Maculinea arion* (Large Blue), *Gortyna borelli* (Fisher's Estuarine Moth) and *Anisus vorticulus* (Lesser Whirlpool Ram's-horn Snail), and are thus fully protected under British law despite the two butterflies having become extinct long ago and now only exist if at all as introductions.

All lists by their very nature are somewhat subjective and open to criticism. The absence of certain taxa groups, for example, Hymenoptera and Diptera, would seem to be in need of explanation and clarification.

Also the retrospective nature of this legislation particularly in respect of species protection will not please everyone in UK and will be seen in some quarters to be counter productive and even unnecessary.

In conclusion it should be made clear that that the above observations and interpretations should be made solely attributable to the author and are thus not necessarily the views of the Society, or any other organisation with which it is associated or gives its support.

For further detailed information readers are directed to the DEFRA Website www.defra.gov.uk/wildlife-countryside/ewd where the full Directive can be viewed together with explanatory notes provided by JNCC covering obtaining licences, general queries and answers.

J. W. Phillips

BENHS – Conservation Working Group

PRESIDENTIAL ADDRESS
PART 1: REPORT

Rob Parker

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Just as a species evolves over time, progressively adapting to the changes in its environment, so a society has to adapt and evolve. Keep this in mind as I talk about the ways that our own Society has evolved over its first 136 years, and is even now adapting to the challenges of the 21st Century.

I have long cherished many of our traditional customs. I delight in belonging to a Society with a Lanternist, and I am not a great reformer by nature. Nonetheless, I have found change happening; the era of the gentlemen's club is over.

Past Presidential addresses have often presented forward-looking aspirations, and today I shall draw on a few of those deep thoughts, because I have progress to report.

Evolution

A species encounters progressively altering circumstances like climate change and makes a response instinctively and progressively. An abrupt change, like a fire, demands a swift response if extinction is to be avoided, and survival instinct will often get them out of a fix. Sometimes societies too may adapt subconsciously, but mostly, they notice changes of circumstance and take conscious decisions on how to respond.

Did our changes of title, from the South London to the British Entomological & Natural History Society stem from a wish to become a national organisation with broader interests than just entomology? Or was it merely an acknowledgement that some of our members lived north of Watford and a few were interested in plants and spiders? It was a human decision, of course, a tentative step from the progressive change of the past, towards a perception of the future.

The loss of the Alpine Club back in 1989 was one of those forced decisions – the ultimate choice between migration and extinction. Andrew Halstead's address noted that the Society was at a crossroads in its fortunes, when a fresh opening arose, leading to Dinton Pastures and a new home base for our collections, library, and workshops.

South Kensington provided many positive links with the Royal Entomological Society, the Natural History Museum and Imperial College, but during our time at Queen's Gate, the attendance at ordinary meetings and lectures has been dwindling. Perhaps this was a consequence of the difficulties and expenses of getting into Ken Livingstone's London. Perhaps too, our members have been shifting their information gathering habits towards the worldwide web. In any event, hardly any ordinary members have been regularly attending ordinary meetings, so change was indicated well before the RES announced their decision to move. Our second eviction forced another abrupt adaptation, an evolutionary step, perhaps.

Questionnaire

The questionnaire to members was a project spanning three Presidential terms. Members responded well (39%) and the answers and comments have been very

useful in guiding Council deliberations. Since the results were published in the journal, we have been busy putting the ideas into effect.

Regional Meetings

Members' requests for regional events came at the very time we lost our regular London venue, and so regional meetings were born. Cardiff and Oxford were both well attended, and facilitated by helpful curators who just happened to be Council members. 2008 started with another museum-based event in Liverpool, covering the immense progress being made with the new national moth-recording scheme. Butterfly Conservation and the Lancashire & Cheshire Entomological Society were our partners in Liverpool, and this opportunity for local collaboration is another dimension that will be exploited at our Winchester meeting next month. And now here we are in Oxford again, this time for our AGM – a meeting we really have to stage within easy reach of a good proportion of our membership.

So, I think we can say we have responded to members' wishes with some alacrity on this count, and future meetings will move around the country to interesting venues – not necessarily always museums.

Website

Mike Wilson's address about entomology on the web led towards the evolution of our own website. If you have not looked at it recently, I would urge you to do so, as it is becoming progressively more useful as a source of relevant entomological information and links. It is a medium for Society news and updates or additions to our calendar of events. Tony Prichard, our webmaster, is working hard at further improvements, so please let him have your bright ideas.

Journal

Members considered the journal to be the most important single ingredient of their membership, yet views were mixed, with some dissatisfied lepidopterists wanting more butterfly and moth articles, and finding little interest in other items. This is a criticism that can only be resolved by lepidopterists sending more articles for publication. As an amateur lepidopterist myself, let me say a few words about writing an article. The first thing to acknowledge is that the journal sets a high standard for scientific articles, and rightly so. But do not be afraid to submit something yourself. It is not necessary to discover a species new to science, so do not set out to write anything too elaborate as your first shot. Write about field craft – advice you can pass on to less experienced entomologists. The chances are that it will come back from the Editor with a few suggested improvements, but you will learn from the process, and develop into another valuable contributor.

Field Meetings

Fieldwork is an area in which the Society takes a proud lead, and climate change has us monitoring the distribution of recently arrived species. Our imaginative programme of field visits is expanding like a species distribution map. In recent times, it has become too big to fit on to our traditional pocket-sized programme card, and now runs to a 32-page booklet. We still need new leaders however, so please let

Paul Waring know where you might take a group. The leader's role is as local organiser – you do not have to be able to identify every bug on the site!

Conservation

Our Founding Fathers were field naturalists and collectors; their studies laid the foundations of present day conservation. Today, we are a society active in the field of invertebrate conservation, and Stephen Miles' address laid out the case for expanding our activities. Yet Conservation is not presently mentioned in our Bye-Laws. We may decide soon that we have evolved to the point that it should be.

Bye-Laws

Re-writing the Society's Bye-Laws has to happen periodically, and to some degree formalises recent evolution. A fresh rewrite is currently a necessity because of the way that our ordinary meetings have been discontinued, but it gives an opening to acknowledge incidental changes too. Stating our conservation aims is one. Another, to which we gave consideration, was the possibility of implementing a two-year presidential term. This could allow a President to see a project through, rather than simply passing the baton to a successor. So, although we have decided not to make that change just yet, we do plan to revise the Bye-Laws to accommodate this possibility for the future.

Membership

I have a few things to say about membership, and I have saved these to last because our membership is our future. An analysis of the present [845] membership, a nice mix of professionals and amateurs, shows that whilst we do have a proportion of ladies and younger members, both categories are under-represented. We want to encourage students of both sexes to join and to participate to a greater degree than at present. We have members from all over Britain, but we are not evenly distributed. 88% live in England, and most of these are in the Home Counties, so it will be interesting to see whether our regional ventures increase our membership away from London.

Our older members are a remarkable bunch. It takes 50 years of continuous membership to qualify as a Special Life Member. Forty-one of them are still going strong and enjoying that enduring hobby of entomology. Indeed, we have three pre-war members, of whom the most venerable is Charles MacKechnie-Jarvis who joined in 1925 and is now 100. In recognition of his 82 years of continuous membership, I am pleased to tell you that Charles has been elected to Honorary Membership.

Deaths are of course, an element of evolutionary change, and now it is my sad duty to tell you about those we have lost.

David Grange, of Harrogate died in 2006, but we only learned of his death recently. His wife survives, and his Lepidoptera collection will pass to a son and grandson, who share his interest in moths. He had been a member since 1967.

Alan Sharman, died last February at the age of 93. Sadly, we discovered his death only in the process of notifying his eligibility for Special Life Membership. He was a butterfly man from Taunton.

Dr Arthur Ewing, an eminent coleopterist and member since 1996, had recently published a monograph on the fungus beetle *Cis dentatus*. His collection has been donated to the Royal Scottish Museum.

William Hoff from Spilsby, Lincolnshire, and interested in general entomology, died in May, having been a member for a decade.

Don Walker, who joined in 1951, was an active lepidopterist, whose exhibits at our annual exhibitions included such diverse subjects as Orthoptera and turtles from Saudi Arabia. He served for a time on Council, was Assistant Treasurer, and completed his 50 years to attain Special Life Membership.

Syd Humphrey was also a Special Life Member, having joined in 1947. He died in December, and has left his extensive collection of butterflies and moths in the care of Malcolm Simpson and Peter Tebbutt.

Theo Homer had been a member since 1956. He was an able moth man, and a guiding light to younger members. He died in a nursing home in Henley on 10th January.

Dr Ian Menzies, a respected coleopterist, and member since 1952 also died in January.

The Meeting stood together in silence in memory of these members. This is a change of procedure, following the cessation of Ordinary Meetings.

Over the year, those eight capable entomologists have been replaced by 31 healthy new members, who will be showing their talents in the years to come. Our Society must deliver at least what new members expect, and hopefully, much more.This is our challenge for the future. To provide the encouragement and training that newer members need, the stimulus to bring out the best in amateurs and professionals alike. To maintain a blend of the honourable traditions of our past, coupled with the benefits of 21st century information technology, and executed with the vigour of an expanding colony of soldier ants maybe. Whether we call it adaptation, evolution, or intelligent design, it is the ongoing process that keeps your Council thoughtful.

I have enjoyed my term as President, and want to end by paying a tribute to the dedication of the individual members of Council, and in particular the Officers of the Society. It has been a privilege for me to chair their meetings, and I have come to appreciate how much we all owe to their enduring endeavours. These stalwarts need reinforcements however, so I finish with a call for volunteers to bring some fresh blood to the team.

SHORT COMMUNICATION

Occurrence of *Capitophorus elaeagni* (Del Guercio) (Hem.: Aphididae) in Kent. – In spring 2008, some of the larger, older *Elaeagnus* × *ebbingei* bushes in our garden had lost their normal lustrous appearance and looked decidedly tatty. Closer inspection revealed that a high proportion of the new apical bronze-coloured leaves were distorted and many of the older, fully-expanded leaves were covered with sooty mould and strands of sticky white honeydew. Large numbers of the aphid *Capitophorus elaeagni* (Del Guercio) and the psyllid *Cacopsylla fulguralis* (Kuwayama) were found but the main culprit producing the white honeydew proved to be the psyllid (see Malumphy & Halstead, 2003, *BJENH* **16**: 89–93). The aphid has been recorded in small to moderate numbers in the suction trap at Wye, but not from a particular site in Kent (see Wood-Baker, *Aphids of Kent*, 1979, *Trans. KFC* **8**: 3–49). From the current evidence one would expect the aphid to be fairly widespread wherever *Elaeagnus* is planted. JOHN BADMIN, Coppice Place, Selling, Kent ME13 9RP.

Fig. 1. A stand of defoliated nettle-trees, near Sannisac, France, June 2007.

Fig. 2. Nettle-tree butterflies mud-puddling on the roadside, near Sannisac, June 2007.

Fig. 3. Nettle-tree butterfly, *Libythea celtis* basks in the evening sun.

PLATE 1

Fig. 1. *Libythea celtis* pupae lined up on twigs of the nettle tree.

Fig. 2. *Libythea* butterflies resting on nettle-tree branches, near Sannisac, France, 2007.
Photos: John Feltwell.

PLATE 2

Fig. 1. Marsh Mallow Moth *Hydraecia osseola* spp *hucherardi.* Photo D. G. Green.

Fig. 2. Breeding habitat of Marsh Mallow Moth, near Rye, East Sussex, 2005. Photo: S. Clancy.

PLATE 3

Fig. 1. The translocation site at Blaxhall Common in June 2007. Photo: Rob Parker.

Fig. 2. Purple Emperor at Theberton Wood, Suffolk, 8 July 2007. Photo: Brian Buffery.

Fig. 3. Silver-studded Blues settled on bell heather in their new home on Blaxhall Heath, 8 July 2007. Photo: Rob Parker.

PLATE 4

COUNCIL, OFFICERS' AND OTHER REPORTS FOR 2007

Council Report 2007

The Society's Council met on seven occasions during the year with, on average, fifteen members attending each meeting. The removal of the Royal Entomological Society to a less accessible location meant that from May we had to seek a new venue for our Council meetings. We were fortunate to be guided by Paul Sokoloff and others to the South Place Ethical Society's Conway Hall in Red Lion Square, Holborn. Our new meeting room is somewhat more functional than the former RES Council Room but the cost of its hire is a third of that we paid previously and the number of Council members attending has increased. So we have gained from the move.

Five members, D. J. L. Agassiz, T. J. Dillon, R. C. Gooden, D. W. Jenner and A. J. Sharman, completed 50 years continuous membership of the Society at the end of 2007 and were elected as Special Life Members. It is with pleasure that we can report that one of our Special Life Members, Charles MacKechnie-Jarvis, celebrated his 100th birthday in August. He joined the Society in 1925 and has, therefore, been a member for 82 years, which may be a record. The Council approved 33 applications for membership but had to strike-off 45 members for non-payment of their subscriptions. Six members resigned and we are sorry to have to record that the deaths of five members were reported to the society during 2007. The deaths included those of three of our Special Life Members, one of whom had been a member for 71 years. On a more positive note a member whose death was reported to us in 2006 has been discovered to be alive and well and remains a member. As a result of all these changes, membership stood at 845 at the end of the year, a net decrease of 32 compared with the previous year. This is largely accounted for by the striking-off of more than twice as many members as is usual in one year. The decrease was predicted last year and follows on from the increase in subscriptions in 2006. The loss of members from this cause should now have made its way through the system and we hope we can now look forward to a more positive period for membership.

The Society has had a quiet year, only disturbed by the destruction by fire of the barn adjacent to the Pelham-Clinton Building at Dinton Pastures. Prompt action by the fire brigade and the fact that the incident happened in the daytime helped to limit the damage to our building to a window cracked by the heat of the fire. The window was speedily replaced by Wokingham District Council the owners of the Country Park and the barn. The Society's Council discussed the potential fire hazards for our building arising from the Country Park activities. These were taken up with the District Council who have taken the actions, and given us the assurances, we requested. We continue to remind the District Council of our wish to acquire the exhibition room attached to our building but the District Council are now consulting over redeveloping the existing buildings on the site. Until a decision on this is reached the future of the exhibition room cannot be resolved. Norman Hall and Malcolm Storey have attended the public consultation meetings at Dinton Pastures on behalf of the Society.

Around 50 members and visitors attended the Society's first Saturday meeting at the Oxford University Museum of Natural History. The day ended with a tour of the Museum's insect collections which was so much appreciated that the organiser, Darren Mann, had some difficulty persuading members that it was time to leave for their homes. We are grateful to the Museum for enabling us to have the meeting. The only meeting held in London this year was the joint meeting with the London Natural History Society in September. This well attended meeting on the history of

insect conservation was presented by Oliver Cheesman, a member of both societies. After the uncertainties of 2006, when it was not clear whether the Loddon Room would still be available to us, it was with relief that Ian McLean was able to arrange a full programme of seven workshop meetings at Dinton Pastures in 2007. These, together with a Coleopterists' Day and 16 Open Days, ensure that the facilities of the Pelham-Clinton Building are well used. The Society's exhibition was again held at Imperial College in November and 216 members and visitors signed the attendance book. In spite of the poor summer weather the number of exhibits seemed similar to recent years, although the photographer, Richard Jones, reported that fewer specimens had been selected for photography. We should like to thank Richard for stepping in the breach and reprising the role of photographer at short notice. The exhibition was followed by the dinner which maintains its regular devotees but to which we do not seem to be able to attract any new blood. Once again the Council must thank Mike Simmons for his apparently effortless organisation of these events. Paul Waring arranged a programme of 17 field meetings, all of which were held in England. We would like to be able to hold meetings in Scotland and Wales but can only do so if members can be found to lead meetings in those countries. Meetings need not be exclusive to the BENHS, joint meetings with other societies are always welcome. In recent years we have had some difficulty getting the programme card printed in time. While reviewing this problem the Council realised that almost all of the information on the card was duplicated elsewhere. The Council, therefore, took a reluctant decision to abandon the programme card. There will be a small financial saving as a result. Some information from the card will, in future, appear on the inside covers of the *Journal*.

The Society's publicity leaflet, based on text originally produced by the late Frances Murphy many years ago and subsequently modified, was thought to be in need of complete rejuvenation. This work was taken on by David Young who has designed and produced a colourful leaflet more appropriate to the 21st century. This met with the unanimous approval of Council and a copy has been distributed to every member. We hope that members will make good use of these by recruiting new members. Roger Hawkins and Graham Collins collaborated to produce a new membership list which has also been distributed to members as an aid to keeping in touch with or discovering other members.

A small band of members represent the Society on various committees. John Phillips and Raymond Uffen represent us on the committees of Invertebrate Link, Mike LeRoy attends Buglife board meetings as a BENHS observer, John Muggleton is on the steering groups of National Insect Week and Moths Count. Eric Classey has represented the Society for many years on the committee of the Cockayne Trust but advancing years have led him to resign this year. We thank Eric for his contribution to the Society over the years, remembering that it is a mere 55 years since he was President of the Society. In future the Hon. Secretary (*ex officio*) will represent the Society on this committee.

After serving for 18 years as Distribution Secretary, David Young has decided to step down from the job although he remains Membership Secretary. Ensuring that the Society's *Journal* and notices reach the members is an essential role in the Society's affairs and we appreciate David's efforts in making sure this happened. Andrew Halstead has replaced David as Distribution Secretary.

The Society's bye-laws were last revised in 1994 and the intervening period has seen a number of changes in the Society's activities. While the Council has some flexibility in determining the day to day operations of the Society, it was decided that a revision of the bye-laws was overdue so that what has become accepted practice is

put on a formal basis. Some Council time has already been devoted to this issue in 2007 but much more will be needed before the changes can be put to the membership and, where necessary, to the Charity Commissioners.

Finally the Council wishes to record its thanks to all of those individuals and organisations, recorded and unrecorded, who have assisted the Society during the year.

JOHN MUGGLETON

TREASURER'S REPORT
FINANCIAL YEAR TO 31ST DECEMBER 2007

The last part of 2007 saw a rapid fall in the financial markets from a probably artificially high to an exaggeratedly low value and the Society's investments reflect this with a fall of just under £9,000. Although this is bad news it needs to be seen in the context of a rise in value in the previous year of £27,000 and a surplus over the original sums invested which still exceeds £100,000. We have no immediate expectation of having to sell any of these investments and thus realise an actual loss. The ability of our investments to continue to provide a substantial part of our total income, nearly 40% this year, is not impaired.

During the year we did encash one investment bond for £22,000 the proceeds of which are on deposit pending a possible purchase of additional accommodation at Dinton Pastures or a return to market stability.

In other respects this has been a successful year financially with expenditure reduced in almost all areas and the cash deficit held to £1,574 compared to £7,514 last year. Some of this apparent improvement results from paying less out in grants and changes in meetings arrangements which may not be regarded positively by everyone, but we remain financially able to deliver to the members the facilities and services they expect.

We are grateful to the late Eric Gowing-Scopes for a legacy received during the year and a further donation from his family.

I wish to thank Roger Hawkins and John Flynn who have again carried out most of the arduous day to day transactions of the Society and our honorary auditors, Alec Harmer and Mark Middleton who have risen to the task as always.

A full set of accounts will be lodged at Dinton Pastures or may be obtained on application to the Treasurer.

TONY PICKLES

Statement of Financial Activities
for the year ended 31st December 2007

	Un-restricted Funds	Restricted Funds	Endowment Funds	Total Funds 31.12.07	Total Funds 31.12.06
Incoming Resources					
Bequests and donations	377	–	–	377	25
Subscriptions	13110	–	–	13110	14933
Investment Income	7209	4561	1082	12852	10615
Trading Income	1880	3136	–	5016	5645
Sundry Income	1098	–	–	1089	2254
Total Incoming Resources	23665	7697	1082	32444	33472

Resources Expended					
Direct Charitable Expenditure:					
Cost of Journal & Distribution	10302	–	–	10302	12468
Cost of facility at Dinton Pastures	–	5182	–	5182	5509
Members Meetings & Services	9050	–	–	9050	9235
Library & Curation	2454	–	–	2454	3977
Grants	888	–	400	1288	4000
Depreciation	2538	2210	–	4748	4900
	25232	7392	400	32024	40089
Other Expenditure					
Management costs	2936	–	–	2936	3330
Trading costs	218	2589	–	2807	2467
	3154	2589	–	5743	5797
Total Resources Expended	28385	9981	400	38767	45886
Net Resources before transfers	(4721)	(2284)	682	(6323)	(12414)
Net Incoming/Outgoing Resources	(4721)	(2284)	682	(6323)	(12414)
Gains & Losses on Investment assets					
Realised	–	–	–	–	–
Unrealised	(4816)	(3307)	(783)	(8906)	27043
Net movement in Funds	(9537)	(5591)	(101)	(15229)	14629
Fund Balances brought forward at 1st January 2007	108499	302044	23719	434262	419426
Fund Balances carried forward at 31st December 2007	98962	296453	23618	419033	434262

Balance Sheet as at 31st December 2007

	2007	2007	2006	2006
Fixed Assets				
Tangible Assets		144436		148006
Investments		236399		268260
		380835		416266
Current Assets				
Stocks	11819		13754	
Debtors	8998		9067	
Cash at Bank and in hand	26815		2535	
	47632		25356	
Creditors:				
amounts falling due within one year	9434		7360	
Net current assets		39198		17996
Net assets		419033		434262
Funds				
Endowment Funds – Hering Fund		23618		23719
Restricted Funds				
Housing Fund	217116		223254	
Special Publications Fund	79337	296453	78790	302044
Unrestricted Funds				
Maitland Emmet BENHS Research Fund	60478		61601	
General Fund	38484	98962	46898	108499
		419033		434262

Tangible fixed assets	*Leasehold Property*	*Fixtures & Equipment*	*Total*
Cost	£	£	£
At 1 January 2007	154736	69399	224135
Additions	–	1178	1178
Disposals	–	–	–
At 31 December 2007	154736	70577	225313
Depreciation			
At 1 January 2007	30940	45189	76129
Charge for year	2210	2538	4748
On disposals	–	–	–
At 31 December 2007	33150	47727	80877
Net book values			
At 31 December 2007	121586	22850	144436
At 31 December 2006	123796	24210	148006

Investments
In accordance with accounting requirements investments are shown in the balance sheet at market value.

	2007		2006	
	M.V.	Cost	M.V.	Cost
Shell T & T	6319	1250	7022	1250
Unilever	10564	248	11483	248
M & G Charifund	91153	20238	101055	20238
Hendersons Bond	61770	58000	63053	58000
AXA Sun Life Bond	66593	56000	62692	56000
Barings Bond	–	–	22955	25000
	236399	135736	268260	160736

Fund Analysis	Tangible Fixed Assets	Invest-ments	Net Current Assets	Total
Endowment Funds:				
Hering Fund	–	23618	–	23618
Restricted Funds:				
Housing Fund	121586	95530	–	217116
Special Publications	–	57773	21564	79337
Unrestricted Funds:				
Maitland Emmet BENHS Research Fund	–	59478	1000	60478
General Fund	22850	–	14364	38484
	144436	236399	37198	418033

These abbreviated accounts are extracted from the Trustees' Report and accounts, a full copy of which has been lodged at Dinton Pastures and is available to members upon application to the treasurer.

TONY PICKLES

EDITOR'S REPORT

This last year saw the publication of Volume 20 of the *British Journal of Entomology & Natural History* in four parts, in March, June, September and December 2007. The average issue was just under 80 pages in length. The last issue of the year was held over to January 2008 so that Society leaflets could be included in the mailing to reduce costs.

It was hoped that the early publication of Part 3 with the annual exhibition report might act as an incentive to members to bring along more exhibits to the coming show, but it seems that the summer weather acted as a dampener to entomologists

and to the number of exhibits in 2007. Personally I think this is a shame and the idea that the exhibition is solely for exhibiting new and exciting finds of the past year, and thus largely dependent on the weather, is a narrow one – it is also an ideal opportunity to present longer–term research findings to a wider audience. If you are undertaking such a study, this is an ideal time to persuade others to help you. The journal is certainly willing to publish members' requests for information that helps with their research (and hopefully as a result to publish their findings in due course).

For the first time ever the exhibition plates were prepared entirely electronically. Jeff Higgott kindly agreed to undertake the photography of the insects using his digital camera (see the image of a Marsh Carpet moth on the front cover of Volume 20 Part 1 as an example of his close-up work). Photographs of individual species were then merged and laid out on a single 'plate' electronically by Darren Mann. The results are most pleasing to the eye, though I remain disappointed that the images were restricted to the Lepidoptera when so many other Orders were on display at the exhibition.

No annual report from the Editor would be complete without thanks to other members of the team: to proof reader Adrian Knowles and the Indexers David Young and Roger Hawkins I would also like to thank those members who have offered their services as referees and compilers of the exhibition reports.

John Badmin

Librarian's Report

2007 has not been a particularly good year for me personally, having spent the last four months virtually house-bound with a broken leg. This has severely restricted my work in the library over this period. However, with the help of Dr. John Muggleton I am pleased to say that our separates have been reorganised. This has resulted in the removal of material duplicated in the journals we hold, and the subsequent disposal of some of this duplicate material by Martin Albertini. Martin is also making progress with the disposal of unwanted and duplicate journals that have been available to visitors to the library for over a year now.

I have now completed the re-arrangement of items on the library shelves, the last job being labelling the shelves with their subject categories. I hope members find this new layout practical and easy to use. I have received no complaints so far.

On advice from Tony Pickles, this year I have arranged for only three boxes of journals to be bound, covering the following titles:

Entomologica Fennica, *Entomologica*, *Entomologica Scandinavica*, *Antenna*, *Annalen den Naturhistorischen Museums in Wien* (A and B), *Annali del Museo Civico di Storia Naturale Genova*, *Beiträge zur Naturkundlichen Forschung in Südwestdeutschland*, *AES Bulletin*, *Beiträge zur Entomofaunistik*, *Doriana*, *Entomofauna*, *Entomologist's Gazette*, *Entomological News*, *Entomologist's Record and Journal of Variation*, *Entomologist's Monthly Magazine* and the *British Journal of Entomology and Natural History*.

There is still a large quantity of journal back numbers that require binding, and several books in need of restoration, but these will have to wait until finances become available.

This year donations of books and journals to the library have been made by John Badmin, Julie Locke, Peter Dyte, Peter Boardman, John Feltwell, Bernard Verdcourt, David Young, Jim O'Connor and Dr. W. G. Tremewan. I wish to extend my sincere thanks these benefactors. I also wish to thank Martin Albertini for assisted transport to the library on several occasions during my period of convalescence.

Ian Sims

Curator's Report

There are no major acquisitions or other changes to report for 2007.

The reorganisation of the Microlepidoptera, which had been promised for some years, got underway seriously and this has now reached the halfway point with families up to the Gelechiidae covered and laid out in 39 drawers, following the order and numbering system of Bradley & Fletcher. This has involved the amalgamation of several collections, principally the incorporation of the Bradford and Emmet collections with the previously existing Society's collection. As mentioned last year those more recently acquired collections can be expected to have a higher level of accuracy than the older composite collection that contains specimens from a range of sources. It is hoped that combining the micro-moths into a single collection will facilitate comparison and checking where this is considered necessary and I welcome any attention offered by specialists in this respect.

There is still a large number of unnamed micro-moths among Eric Bradford's duplicate collection. I am grateful to Ian Sims for determining some Tineidae and to Alan Coates for work on the Tortricidae. Any assistance by other specialists would also be appreciated.

I am indebted to Tony Pickles for his thorough work on expanding the layout of the Torstenius collection of Scandinavian Lepidoptera, to incorporate the recent donation of additional material to that collection. This work is not yet complete but good progress was made in 2007.

Several members have continued to donate valuable material to fill gaps in the collection and I am also grateful to them. As promised last year, a record book was provided in which donations are now recorded. This both assists in keeping track of donations and ensures that any additions to the collection are added to the annotated checklists so that information on species held remains up to date.

I also wish to thank those members who have revised material of particular genera or species, which helps towards enhancing the accuracy of the collection. In particular I would like to thank Mark Telfer for work on the Carabidae and Ian Wallace on the Trichoptera.

I spoke at length last year about the level of accuracy of the collections and the ways in which that can be improved so will not repeat those comments here. I am grateful to Mark Telfer for his further suggestions about how progress can be made, that are now under consideration.

In a previous report I related the unusual event of a prolonged power cut during an open day in 2002. This recently happened again and the member who came to the rescue with his generator last time, although present, had not brought it this time so activities were brought to an early close. Hopefully this will not recur but in view of the comment made last time about the lack of availability of a torch being relevant again this time, the Curator will in future always ensure that a torch is available in the building.

Events at our building have continued to be well attended, although still benefiting from our lively band of regulars and more attendance from the wider membership would be welcomed.

Once again I would like to thank Martin Albertini for continuing to ensure that satisfactory internal environmental conditions are maintained both for visitors and for the library and collections.

Peter Chandler

Professor Hering Memorial Research Fund Report

Only two applications were received during 2007, and both sought money for projects to be undertaken in that year.

Kara Majerus, a student at Hill's Road Sixth Form College, Cambridge, intends to undertake a project to ascertain if the spread of the sexually transmitted fungus *Hesperomyces virescens* on lady-birds is being affected by global warming. She was awarded a grant of £400 for travel and some equipment under the category of general entomology.

The second application was for an award to enable travel to a conference in the USA to present a paper on the molecular approach to wildlife diseases. The committee rejected the application on the basis that the subject was not within the topics for which the Fund was set up, and that there were many funding bodies more appropriate to this work.

The few applicants probably resulted from a lack of advertising in the last few years and so I shall endeavour to "spread the word" in the coming months.

It was a pleasure to welcome Paul Sokoloff on to the committee, in fact, I believe "back" on to the committee and look forward to benefiting from his experience.

I am very grateful to the other members of the Hering Committee for the work they have done in assessing applications to the Fund.

David Henshaw

The Maitland Emmet BENHS Research Fund Report

Two applications for grants from the Fund were made in 2007 and both were successful. Gillian Lye received £500 towards the cost of travel to New Zealand to carry out autecological studies of populations of British origin of the bumblebee *Bombus subterraneus* (L.). This species is now extinct in the UK and the proposed work will help to assess whether the New Zealand populations are a suitable source for possible reintroduction of the species to the UK. Emma Ross received a grant of £387.50 for travel and accommodation expenses to enable her to visit localities in Wales and Shropshire to record and photograph various Red Data Book and other species of caddisflies known to be found in the area.

Reports for both grants awarded in 2005 are now overdue.

The Society's thanks are due to the members of the Research Fund panel for their deliberations on this year's applications.

Applications for future awards from this fund in the fields of non-marine arthropod taxonomy, field biology and conservation related to the fauna of the British Isles should be sent to the Society's Honorary Secretary (from whom further details can be obtained) before 30th September in any year.

John Muggleton

The Bees, Wasps and Ants Recording Society (BWARS) Report

BWARS is primarily a recording society and publishes *Provisional Atlases* of the British aculeate Hymenoptera. It also produces a bi-annual *Newsletter* that in recent years has developed into something more closely resembling an entomological journal.

The highlight of the society's year is the AGM and workshop, usually held on the last weekend in September. In 2007 the meeting was held at the Hope Department of

Entomology, Oxford University Museum. Attendance was high on both days. The workshop session provided an opportunity for both beginner and expert to identify and confirm specimens caught during the year, and included workshops aimed at the full range of abilities, from a beginner's guide to wasps to separation of ants in the genera *Tapinoma* and *Stenamma*.

On the Sunday members' talks covered a range of topics. Nico Vereecken described his studies into the relationship between bees and orchids. Rob Paxton highlighted the problem of *Bombus lucorum,* which turns out to comprise three species (*lucorum*, *cryptarum* and *magnus*) separable only by genetic and chemical analysis, at least in the worker and male castes. Michael Archer talked about his continuing studies of social wasps, and in particular the development of the queen nest. Geoff Trevis described his investigations into habitat features used by aculeates and how to maintain them, based on a site in Worcestershire. Finally Stuart Roberts and Deborah Proctor outlined their plans to review the statuses of British aculeates and produce an updated Red List for Britain. The session concluded with members' 'slides'.

Considerable progress was made in making distribution data available to the National Biodiversity Network. This mainly involves validation of records, a process being aided by the development of automated validation tools. The NBN currently holds 280,000 records provided by BWARS, a total soon to be increased to about 360,000. These data are available on the NBN website and is also accessible from our own site – *www.bwars.com*.

The society has also become increasingly concerned by the lack of keys to the identification of aculeates. In collaboration with the RES a number of members are currently re-writing many of the Handbooks which have become outdated and in some cases have been allowed to go out of print. Through the dedication and perseverance of Robin Williams, members have been working on a popular book on British bees, which, having reached the stage of a publisher being appointed, should be available in the not too distant future.

GRAHAM A. COLLINS

DIPTERISTS FORUM REPORT

Despite a rather unfavourable year for insects Dipterists Forum had another good year with our usual mixture of indoor and field meetings.

The year started with an identification workshop at the Preston Montford Field Studies Centre, this year on Scathophagidae and Sciomyzidae, in addition to being a very successful workshop it provided an opportunity to gather feedback on the keys for future handbooks.

The Spring Weekend Field Meeting was held in Norfolk, staying in B&B accommodation at Castle Acre. This scenic village was well placed for visits to some sites containing pingo pools that are famous for their extensive Diptera species lists. Many significant records were obtained and as usual with these meetings, it was also an enjoyable social event.

The Summer Field Meeting was based in the Halls of Residence of the University of Wales, Aberystwyth. The accommodation and food were both excellent. Unfortunately, the same could not be said about the weather and although on most days we were able get into the field it was often a difficult decision between heading for the coast or trying further inland to avoid the rain. At the end of the meeting some had to make their way home through, or around, the summer floods that had started in parts of England.

The Autumn Field Meeting was based at Loughborough for sites in the Charnwood Forest area. After the cool damp summer, perhaps combined with the effects of the dry weather the previous year, the number of flies taken was lower than usual at an Autumn Meeting. Surprisingly the total number of species recorded was not as low as expected, there were just fewer individual insects.

The Dipterists Forum Annual Meeting and Dipterists Days 2007 were held at the Hunterian Museum (Zoology) of the University of Glasgow. As usual there was an interesting programme of talks on subjects as diverse as the "Hunterian Museum, its history and contents", "Riverine Flies", "Saproxylic Calyptrata", "Invertebrate Conservation in Scotland", and "Conservation of Lonchaeid Flies". The AGM of Dipterists Forum was held in the afternoon, followed by informal discussions. There was a Dipterists Supper in the evening at a very good Indian restaurant. The following day there was time for Diptera Recording and Study Groups to hold meetings and presentations combined with an opportunity to make use of the Museum's Library and Collections.

Dipterists Forum membership stands at 307 and there are 294 subscribers to our peer-reviewed journal *Dipterists Digest*. The Membership Secretary again took our publicity material to the AES Exhibition at Kempton Park.

Following the enormous amount of work done by our BAP and Conservation Officer a total of 35 Diptera species were included in the final Biodiversity Action Plan list. It is apparently necessary that all BAP species have English common, or vernacular names in order to assist legislators, politicians, journalists and the public. After extensive discussion, proposals were made where suitable names were not available or were felt to be misleading. Some examples being, the Spotty Sap Fly, Clubbed Big-headed Fly, Broads Dolly-fly, Mountain Dance-Fly and Hairy Canary Fly. The latter name inspired by early miners taking a canary underground with them because its sensitivity to carbon monoxide would give early warning of the presence of an otherwise undetectable hazard. In the same way, the fly *Phaonia jaroschewskii* (Schnabl) RDB2, Muscidae which is hairy and lives in healthy sphagnum bogs, provides advance warning of the degradation of the habitat when it disappears from a former quality site.

KEN MERRIFIELD

SHORT COMMUNICATION

Eucalyptus parasitoid naturalised in Kent. – The main psyllid on eucalypts in Europe, *Ctenarytaina eucalypti* (Maskell) (Hemiptera: Spondyliaspidae) has declined dramatically in numbers since the introduction of the parasitoid *Psyllaephagus pilosus* Noyes (Hymenoptera: Encyrtidae) in 1990s. On 9 July 2007 I was given permission to inspect two experimental plantations of *Eucalyptus* cultivars on private land in our village, ostensibly to search for the new eulophid *Ophelimus ?maskelli* Ashmead. Although there was plenty of evidence of past infestations by *C. eucalypti* the majority of nymphs had been parasitised. Further searching of the leaves revealed the presence of several individuals of *P. pilosus* which is now obviously well established in the area. Many of the nymphal skins had circular exit holes through which it was assumed the parasitoid had emerged. – JOHN BADMIN, Coppice Place, Selling, Kent ME13 9RP.

THE 2008 PRESIDENTIAL ADDRESS – PART 2 WORKING AT BUTTERFLY RE-ESTABLISHMENT – LESSONS FROM TWO CASE STUDIES

ROB PARKER

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INTRODUCTION

Circumstances have recently involved me closely in two attempts to establish butterflies to new locations in Suffolk. Because the two cases are so different, I thought members might be interested to hear about them. I will intertwine the two stories with the conservation criteria for re-establishment, and we shall see how each of them measures up.

It was in the summer of 2005 that I received a call from a chap I did not know. He told me that *Apatura iris* (L.) (Purple Emperor) had been released at an undisclosed location, had survived the winter, and were now flying around the oaks. *Iris* has not been a Suffolk species for 40 years, and I knew from the outset that this had been an unauthorised release. A couple of days later, he called back, saying that the fellow responsible for the release had agreed that details of the site could be disclosed to me. We will come back to the detail.

The following year, as Conservation Officer for the Suffolk Branch of Butterfly Conservation, I found myself working with the Suffolk Wildlife Trust to organise the release of *Plebejus argus* (L.) (Silver-studded Blue) to a new site in the Sandlings near Snape. I knew this was an objective within the scope of the Suffolk Biodiversity Action Plan, and would have to follow the correct procedures. The Silver-studded Blue is Suffolk's smallest resident butterfly, and the newly arrived Purple Emperor had just become our largest. For the sake of brevity, from now on, I shall refer to them simply as *argus* and *iris*.

THE RELEASE OF *IRIS* AT THEBERTON

The release site for *iris* was at Theberton, and for those of you that do not know our east coast, it lies between two more familiar places – Minsmere RSPB reserve and Sizewell nuclear power station. After discovering the location, I drove over there promptly the next morning, arriving with my wife at 10.00h. I was surprised to find a fellow already in position, binoculars focussed on the oaks. We watched and waited patiently, but saw nothing all morning, and I began to think the whole thing might have been a hoax. Only at 15.00h, did a female *iris* drift along the sallows fringing the car park. We got a decent look, and the female appeared to be searching for a suitable spot for oviposition. Suddenly, an unlikely story had become a reality; we had *iris* in Suffolk, albeit just a released specimen.

Theberton Wood is managed by the Forestry Commission, but it is a small wood (approx 20ha), short on wide rides and glades. To me it looked far from a perfect home for the species, despite its mature sallows.

The fellow responsible for the release is known to some BENHS members. Rather than ignore his unauthorised release, I decided to make a direct approach to him. When I asked whether he had the landowner's permission for the release, he said not.

He told me that he had been making releases over the previous five or six years, using stock from the south of England, which he had reared at home. Early attempts had failed, but in 2001, he had succeeded in hand pairing 15 females, and these, along with 15 males, had been released at Theberton. He believed that those flying there were the progeny of that release, though he had topped up with a further 12 in 2004. I expressed the view that the wood was not really suitable, and that he could not expect a colony to survive. Interestingly, he had chosen the wood with care. He knew it well, having been a forester there in the 1980s, and said that he hoped it would serve as a reservoir from which *iris* could spread. There are plenty of drainage ditches in the area, with sallow along their length, and a number of larger woods out towards Minsmere and Sizewell. None of these woods had any history of supporting the species. Although the receptor site lies beyond the present distribution of *iris*, it might be perceived as lying within its wider geographic range.

He told me that his original stock had come from a private wood near West Grinstead, and that they were removed with the landowner's consent. I stressed the importance of monitoring the colony to establish whether they were truly self-sustaining, and he undertook not to make any further releases (at that site).

Opponents of freelance releases consider that they are generally made at inappropriate locations and will not succeed as introductions, but will produce stray records and spoil our understanding of what constitutes our natural fauna. In recent years, *iris* has been noted to be naturally re-colonising woodland in Bedfordshire and Hertfordshire. In time, it might have found its way to Suffolk naturally. I was concerned that any publicity could generate copycat releases elsewhere, not only of *iris*, but perhaps of totally inappropriate species in unsuitable habitat.

I was torn between denouncing an inappropriate release doomed to failure, and hoping that *iris* would have the determination to flourish. Although it was an unauthorised release, it was not illegal. My position as county recorder led me to notify the Suffolk Biological Records Centre of the release, and to pass on the details that had been given to me. It also led me to read up the ground rules for making an establishment attempt.

Codes & guidance for re-establishment attempts

This audience will be familiar with the 1986 code prepared by the Joint Committee for Conservation of British Insects (JCCBI) and perhaps the parallel rules issued by Butterfly Conservation for re-establishments undertaken on their behalf.

A few definitions, which have gained general acceptance, are shown in Table 1. Bear in mind that these relate to plants and mammals, as well as invertebrates.

What happened at Theberton was a freelance Release, and might well be called an Introduction - if we credit the releaser with the intention of establishing the species for conservation purposes. What was planned for *argus* was a Translocation, in an attempt to achieve a Re-establishment.

Re-establishing *argus* in Suffolk

So that brings us back to *argus*, a common butterfly in its European context, but a UK BAP species. The map in the Millennium Atlas (Asher *et al.*, 2001) shows its progressive demise over 30 years of habitat loss. Colonies remain along the Suffolk coast in several clusters. They survive where decent heaths occur in the Sandlings, running up from Ipswich, past the strongest population near Minsmere, to

Walberswick. But individual colonies are isolated, with a wide gap in the middle (Joy, 2000). The Suffolk local Biodiversity Action Plan (Suffolk Biodiversity Working Group, 2000a) calls for re-introductions to suitable sites, with the objective of bridging the gap. This was begun in 1998, with the introduction of another isolated colony at Aldringham Walks.

The receptor site

The site selected for the 2007 translocation, Blaxhall Common SSSI, just south of Snape, is a piece of relict heather heath which was identified as a potential receptor site in 2003, and has been restored over the past five years, with *argus* in mind. The photograph in Plate 4 shows how it looked in June 2007, with the bell heather in flower on an area of mainly mature ling. We know that *argus* succeeds in Suffolk only on heaths with a good proportion of bell heather.

Blaxhall Common is surrounded by the Tunstall Forest, which was planted between the wars in what had previously been a much wider area of heather heath. The growth of scrub caused the loss of the butterfly, though this situation has been rectified by a decade of restoration work by the Suffolk Wildlife Trust. Three independent assessments have judged the site to be of adequate size and condition for a re-establishment (Ravenscroft, 2003; Parker, 2007). It is already managed as a lowland heath SSSI, for the benefit of the heathland community, and *argus* is a missing ingredient of that community. Nonetheless, there must be no adverse impact on other species. Several interesting species are present; including *Eurolion nostras* (Fourcroy) (Ant-lion) and *Aphanus rolandri* (L.) (a Notable A hemipteran, which feeds on climbing corydalis), and their microhabitats will be preserved.

Donor sites

Turning now to donor sites, we gave consideration to two possibles, the Minsmere complex to the north of Blaxhall, and the Hollesley Commons to the south. Both are strong colonies, with interlinked metapopulations, and would comfortably stand a loss of 30 adults. They are geographically close to Blaxhall, each being about nine miles away, though this is too far for regular genetic exchange. Existing good relations with RSPB and the private Estate of R. H. & R. Paul meant that we had no difficulty obtaining approval from the landowners. One would have served, but there are benefits in taking from more than one donor site:

– less impact on donor colony.
– a measure of genetic diversity.

Also, taking two separate batches:

– improves the chance of a period of good settling-in weather.
– produces a more natural spread of egg laying over a longer period.

I believe we met all the requirements at the donor sites for our translocation of *argus*. The arrangements made for *iris* by breeding on from adults caught in Sussex met the criteria in a different way.

Meeting the relevant criteria

Consider the codes of guidance that have been published for species restoration. The current versions are shown in Table 2. They present similar considerations,

Table 1. Terminology - as listed in Butterfly Conservation Branch Handbook (in line with IUCN definitions, but abbreviated here)

Introduction	Attempt to establish a species, for the purpose of conservation, outside its recorded distribution but within an appropriate habitat & eco-geographic area. Also known as Conservation or Benign Introduction.
Re-introduction	Attempt to establish a species in an area which was once part of its historical range, but from which it has been extirpated or become extinct.
Re-establishment	A synonym for re-introduction, but carrying the implication of success.
Re-inforcement or Supplementation	Attempt to strengthen or modify an existing population by the addition of individuals of the same species.
Translocation	Deliberate moving of individuals from one site to another in an attempt to effect one of the above.
Release	Action of letting go live animals; often used to describe opportunistic, casual or clandestine efforts.
Restoration	The overall purpose and context for re-introduction attempts. (Needs an objective and planned strategic basis.)

worded as slightly different criteria. Listed first is the World Conservation Union's umbrella document.

In addition to the JCCBI and Butterfly Conservation (BC) codes, the English Nature guidelines extracted from the 1995 Species Conservation Handbook proved particularly helpful. Presumably this document will re-appear with a Natural England badge in due course.

Clearly, for the Suffolk translocation, it would be necessary to heed all the relevant criteria. Many of the 43 IUCN criteria cover the vaccination of mammals etc, so we are left with a manageable set of just 22, which can be broken down as follows (Table 3).

The total depends on whether you split or lump; 22 is my own analysis. Many of these have an ecological basis, particularly those to do with receptor and donor sites. Those under Planning are more procedural and consultative.

Investigating the legal angle, I established that no licence was required for *argus*, nor for *iris* for that matter, as neither were listed species. Because Blaxhall Common and both the donor sites are Sites of Special Scientific Interest, it was clear from the outset that we would need consent from Natural England. To avoid unnecessary time delay, we engaged the Suffolk Team of Natural England right at the start with our first field inspection. This was a good decision, and enabled us to get the project through very smoothly and swiftly. From initial discussions in November of 2006 to the second translocation (in July 2007) was nine busy months.

Planning for success

Armed with so much advice, I continued the planning and quickly realised that the guidelines all had something to say about success, but did not really explain *how* to achieve it.

JCCBI: The number of insects released should be large enough to secure re-establishment.

BC: Sufficient numbers to ensure a reasonable chance of establishing a genetically diverse population. Give evidence of likely success of the species establishing and sustaining itself.

EN: Give targets for measuring success at both receptor and donor sites over at least five years.

Judging one's own plans subjectively is not an easy task – you would not be attempting it unless you were reasonably optimistic, would you?

Methods & techniques

Guidance on the topic of best practice for particular techniques is a bit thin. JCCBI does say that the stage to be released (i.e. egg, larva, pupa or adult) depends on circumstances; there is no generally applicable rule. Helpfully, it adds that species with sedentary adults may be expected to lay eggs in the most appropriate site, whereas active species may fly away before oviposition. A contrast here, between what might be a significant difference between the truly sedentary *argus*, and the powerfully flying *iris*.

Immature stages would need to be released in larger numbers, to allow for mortality before reproduction. That is fair enough, but none of the sets of guidelines actually talk numbers, so I checked the details of a recent release in Norfolk, (Harris, 2006) in which 30 adult *argus* had been released, and this had been sufficient to produce a promising hatch the following season, without significant impact at the donor site. One lesson here is that any well-documented attempt will provide useful guidance for the conservationists that follow; and that applies even if a re-establishment fails.

Like Norfolk, I decided to release adults, really because they are easy to catch, whereas finding or breeding the other stages is difficult for *argus*, partly because of its myrmecophilic habits. Ideally, we would collect mating pairs, to ensure that our females were ready to lay eggs on arrival at the new site. To take 15 pairs from any one donor site seemed enough – a larger number could have had an impact on the donor colony in a poor year.

Table 2. Codes on Re-introduction etc.

Org	Date	Full Title	Criteria
IUCN[1]	1998	Guidelines for Re-introductions[2]	43
JNCC	1996	Review of information, policy & legislation on species translocation[3]	–
JCCBI	1986	Insect Re-establishment – a code of conservation practice	10
EN	1995	Guidance Notes for Invertebrate Translocations and Introductions[4]	12
BC	2001	Lepidoptera Restoration, revised	10

1. IUCN stands for the International Union for the Conservation of Nature and Natural Resources.
2. An umbrella document, covering all living organisms, globally. Covers conservation introductions only, but specifically excludes introductions for commercial or sporting purposes.
3. Reviews international and UK legislation in 329 pages.
4. From the English Nature Species Conservation Handbook.

Table 3. Breakdown of Relevant Criteria for translocation.

Category	Criteria
Legal	2
Planning	8
Receptor Site	6
Donor Site	4
Follow-up Action	2
Total:	22

Timing

On the matter of timing, *argus* males take to the wing towards the end of June, and as the females join them, numbers peak early in July, making that the optimum time to take the first batch. If the second batch were taken from a different donor site the following day we would be close to putting all eggs in one basket in terms of suitability of conditions at the receiving site. However, leaving a gap would spread the arrivals, and subsequent egg laying, in a way that might create a more natural spread for the fresh colony. This thought was strengthened by knowledge of the earlier introduction at Aldringham Walks in 1998, when an unintentionally late translocation of only about 15 *argus* had proved unexpectedly successful. Taking two batches on different dates would also cater for an early or late emergence and improve the chances of hitting good weather in the days immediately following the release. We tentatively set two dates in July, separated by two weeks, one from each donor site.

Planning

We assembled the Translocation Proposal exactly as advised by the English Nature guidance notes. Its preparation was made easier by the existence of a Suffolk Local BAP, with a Species Action Plan (SAP), and a number of professional reports prepared for the Suffolk Wildlife Trust (SWT) (Ravenscroft, 1996, 2003). These covered the *argus* populations in the Sandlings, and recommended Blaxhall Common as a potential release site. Because the SAP and the ecology reports had already been widely circulated and officially endorsed, we had no difficulty getting approvals.

Obtaining consent for the release from the site owners, Blaxhall Parish Council was not a problem, due largely to existing good relations with SWT. At an early stage, another reason for selecting two donor sites was to cover the possibility that landowners might not like the idea. In the event, RSPB, owners of the Minsmere Sawmills site, were quickly supportive, as were R.H. & R. Paul, the private owners of Lower Hollesley Common.

The submission to Natural England and Butterfly Conservation (Parker, 2007) amounted to 14 pages of close-typed A4, including two Annexes, one being a detailed report of the condition of the Blaxhall site, and the other giving the population history at the donor sites over the past ten years. Because *argus* is a BAP species, well-recorded annual counts (Stewart, 1996–2003; Parker, 2004–2007) allowed us to compile the records with relative ease.

Weather

None of the guidance mentions weather (or timing) but when David Sheppard read the detail of our Translocation Proposal, Natural England did suggest the insertion of a minimum weather clause. We specified a minimum ambient temperature of 17°C, wind not exceeding 10 knots/Beaufort scale 3, and no rain expected. It was the rain that nearly forced us to cancel; because we hit showery weather at the very time we had planned the move. In the event, we were lucky, and the rain fell elsewhere, quite heavily actually. The winds were at the maximum, but that was less of a problem as we were ready to wait for the calm of late afternoon before releasing.

Comparisons

It is instructive at this stage, to compare our thoroughly prepared plans with the more casual approach to the bureaucratic demands of planning that preceded the release of *iris*. For *iris*, there was no species action plan, and the objective of the release was not clearly defined. The releaser should be given credit for understanding the ecological imperatives, but there was no consultation, or written plan, let alone agreement. There was no species recovery strategy for re-introduction to sites in Suffolk, and his drip-feed technique fell short of evidence for success. Table 4 shows how the two case studies measure up to each of the 22 criteria. Most of the criteria are adequately met, some fall short and a few are subjective or unknown.

Ants

One important proviso had to be inserted into the proposal, and that related to the ant population. The proposal was being drafted following a site inspection in late November – not at all a favourable time to conduct a meaningful ant survey. We asked for approvals subject to completing a satisfactory ant survey in May. The two suitable ant species, *Lasius niger* (L) and *L. alienus* Foerster had both been found in 2003, but we needed to confirm their presence in adequate numbers in precisely the right spots for the releases. As it happens, the taxonomy of the relevant ants has been revised (Seifert, 1992), and those two species have each been split, to create a total of four species:

Lasius niger (L) plus *L. platythorax* Seifert
Lasius alienus Foerster plus *L. psammophilus* Seifert

Since the split, its application to species found in Britain has been examined (Blacker & Collingwood, 2002, Orledge, 2003) but nothing had been published to specify which of these actually tend the larvae of *argus*, although common sense suggested that any of the four was likely to be suitable. In the event, our May ant survey was successful, with Nick Blacker finding 11 ant species, including:

Lasius niger in small numbers, and *L. psammophilus*, the sandy habitat specialist, in good numbers right across the site. The heath includes areas of re-generating heather with a good proportion of fine grass as well as the older, slightly leggy heather that presently makes up most of the common. It was feared that the ants might have abandoned the areas of leggy heather, where the sun no longer reaches ground level, but happily, they were still present. In the areas foraged only six months previously, we were particularly pleased to find the ants still nesting in the vicinity of small quantities of heather re-growth likely to be selected for egg laying.

So we were able to report success to Natural England in time for them to issue the formal letters of consent on 13 June – just two weeks ahead of our planned translocation, in what turned out to be an exceptionally early season.

Funding

I had not anticipated that the translocation would be a costly operation, but when it was suggested that cash would cover any costs and allow us to repay volunteer expenses, it suddenly seemed like a good idea to follow Norfolk's example and apply for a grant. Generously, Suffolk's Coast and Heaths Unit made an award from their Connect Fund – a kitty supporting biodiversity in the Sandlings Area of Outstanding Natural Beauty. As things turned out, most of the volunteers were very local, and chose not to make travel claims, so we finished up spending some of the money on an interpretation board, and more on producing a report which is informative and glossy (Parker, 2008), because it is aimed at reaching a wider audience of naturalists than just the obligatory recipients of the Record of Insect Establishment report.

First translocation – 18 June 2007

Climate change has been bringing the first emergence of *argus* forward over the last five years or so, and 2007 brought our earliest-ever *argus* sighting on 4 June – sufficiently early to force us to bring forward the first translocation date. We did this by leaving the Hollesley appointment on the pre-arranged date, and leapfrogging the Minsmere Sawmills fixture forward to 18 June. No sooner had we taken this decision, than the early warm weather faded, only to be replaced by a forecast of relatively cool, breezy days, with heavy showers forecast. Instead of *argus* numbers picking up, they seemed to stabilise at a rather low plateau, and we approached the day with some trepidation. Fortunately, the target temperature was met, and by 11.00h there were adequate numbers of roosting butterflies, but no sun. Collecting roosting females was quite easy, and we simply closed them into plastic tubs. As the skies got greyer, we realised that this was not a day for courtship, and we were not going to be able to collect mating pairs. We decided to take 20 females and 10 males, and to give them a chance of mating by putting them all into an airy muslin cage. We watched, but no pairing took place, only rejection behaviour by the females. We hoped that this was a sign that they had already mated. Fearful of rain, we drove them the ten miles to Blaxhall Common, some in the cage, others still in tubs.

It was overcast with a 10 knot wind over the open heath, but the three pre-planned release points were reasonably sheltered. Each is close to a recently foraged area with pioneer growth already visible and ant activity in evidence. Behaviour on release was encouraging. Although some drifted off in the westerly breeze, others remained feeding on the *Erica* very close to the release sites, which are separated by about 100 m.

Very quickly we had liberated all 30, and the butterflies seemed at home, the showers had stayed at bay, the first phase was done and the butterflies were left in the care of the local volunteer warden.

Second translocation – 3 July 2007

The pre-planned translocation from Lower Hollesley was executed on 3 July in bright weather during a generally showery week. All 30 butterflies were taken from

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Table 4. Two case studies measured against the criteria for re-establishment attempts.

	A. iris	*P. argus*
Legal/Bureaucratic		
Release of non-native species illegal	OK	OK
No conflict with requirements for legally protected sites or species	OK	OK
Planning		
In line with Species Action Plan	No	Yes
Clear Objective (e.g. pest control, research, conservation)	?[1]	Yes
Ecology Understood	Yes	Yes
Full consultation in advance; approvals required	No	Yes
Landowner consent and approval required.	No	Yes
Site/population history provided over 5 years	No	Yes
Re-establishment plan produced & agreed by all parties	No	Yes
Donor & receptor sites fit species recovery strategy	No	Yes
Evidence of likely success of species in establishing & sustaining itself	No	Yes
Receptor Site		
Receptor site within natural range of species	?[2]	Yes
Receptor site does not presently host a colony of the species	Yes	Yes
Factors causing extinction identified & corrected	N/A	Yes
No adverse impact on other species at receptor site	Yes	Yes
Receptor site of adequate size & in adequate condition for success	?[3]	Yes
Donor Site		
Donor stock genetically similar to extinct population	Yes	Yes
Donor site capable of supply without endangering its own population	Yes	Yes
Donor stock provide no threat to genetic integrity of animals at receptor site	Yes	Yes
Captive bred stock without abnormalities	Yes	N/A
Follow-up Action		
Project will be adequately monitored, recorded & evaluated	No	Yes
Long-term commitment to appropriate management	?[4]	Yes
Criteria unfulfilled	8	0

Notes on uncertainties [marked ?]: 1. Objective not published. 2. Beyond present distribution. 3. Theberton Wood small, but wider area possibly adequate. 4. No arrangements made in advance, but some subsequent follow-up.

Lower Hollesley 'A', where they were sufficiently abundant that there was no need to visit the interlinked 'B' colony. One mating pair was found and moved in cop. The balance comprised 19 females in variable condition and 9 fresh males, making another batch of 20 females and 10 males. These were released at Blaxhall Common from 12:00–12:30 h; using the same three release points as the first batch 15 days previously. Most remained in the immediate vicinity of the release points, just resting on heather. After the releases, a single male was encountered in the north of the common, presumably a survivor from the 18 June release.

Publicity

Press releases resulted in two articles appearing in the Eastern Daily Press and one broadcast on BBC Radio Suffolk. These undoubtedly had an educational effect on

the public, as well as drawing attention to the good work being done by Suffolk Wildlife Trust and Butterfly Conservation. We invited the media to observe the second translocation, but they were too idle to attend, and took the easy option of using our press release, along with some photographs we took whilst waiting for the sun to come out.

Monitoring at Theberton & Blaxhall – 8 July 2007

We staged an interesting double field visit on 8 July – five days after the second release. In the morning we went to Theberton to check on *iris*. I arrived early, and found about 20 people already assembled around a tree stump, admiring the living proof that *iris* had survived another season (Plate 4, Fig. 2). This makes three years of my own observations, and six since the 2001 release. At least one other flew over our heads whilst the first was still feeding.

In the afternoon, we moved on to Blaxhall, and a team of 19 volunteers walked a transect route on a broad front, and found butterflies close to two of the release points, but not at the third (Plate 4, Fig. 3). This is an area of small tumuli, which looks good to the human eye, but being at the highest point of the site, is relatively exposed to the wind. At least ten were found close to the release points, and another four were found roosting in medium height heather 100 m west of the closest release point.

The overall impression was that the butterflies had moved a little northwest, but were settled into the habitat. It was encouraging to have found at least 14, five showery days after the second release. Doubtless others remained on unvisited parts of the common. We must hope that plenty of eggs have been laid.

A few informal visits produced sightings in the following weeks, but by 26 July, unsurprisingly, there were none left on the wing.

Future monitoring

To monitor *argus* at Blaxhall Common, a single-species transect has been established, and volunteer walkers found. It begins further south than the first release point, and stretches further northwest than any of the three release areas. The results in 2008 will show whether the translocation has been an initial success, and future years will determine whether the colony becomes properly established and extends. Under the relevant guidelines, we are encouraged to continue monitoring the site for ten years.

Whilst no formal records were written for the early stages of the releases at Theberton, it seems sure that casual visits from local naturalists will ensure that the status of *iris* will be well monitored in the future.

Site management

Already an SSSI, Blaxhall Common is managed in pursuit of the Lowland Heathland habitat action plan (Suffolk Biodiversity Working Group, 2000b). The common has been brought up to a suitable condition for *argus* by the endeavours of Suffolk Wildlife Trust staff and a team of local volunteers. Heather cutting, silver birch removal, bracken control and the creation of bare areas have all been necessary. This work has been with the financial support of Natural England and landfill grants. A continuing commitment to heathland management is essential to maintaining the right habitat for the butterfly.

At Theberton, no steps had been taken to implement appropriate management work for *iris*. Nonetheless, some is now in progress. The individual who had conducted the releases had been seriously concerned that Forest Enterprise would eliminate the sallow, and he has now ensured they are aware of the importance of keeping it for *iris*. The Regional Forest Officer, Simon Leatherdale, is fortunately an enthusiast. Since learning of the release, he has begun felling the conifers, and has opened up the main rides to let more sunlight in.

Documentation

The required follow-up action includes monitoring and recording - the detail often overlooked in freelance releases. The official JCCBI form to report a re-establishment attempt does exist, but it was not easy to obtain, and very few have been submitted in the 20 years since it was created. At least, by properly documenting and notifying both attempts (Parker, 2008), we have added to the bank of data available to assist in future re-establishments. It could be only too easy for the organisers of a failed introduction to lose heart and not bother to properly record their attempt.

Criteria unfulfilled

Concluding our comparison, it is clear that the unofficial release of *iris* obtained better scores where the requirement was ecological understanding, rather than for planning. The bottom line of Table 4 shows that the *iris* introduction fails to completely meet eight of the criteria, but for the time being, appears to have succeeded. Our *argus* translocation, on the other hand, has achieved all the theoretical requirements, but awaits Nature's judgement.

Enough eggs?

It was not possible to collect mating pairs on the days that the translocations were planned, and this could mean that fewer eggs were laid than we would have wished. Partly, this was the result of setting a date in advance and finding that the weather, whilst meeting our minima, fell short of perfect mating conditions. Better results might have been achieved with a more flexible approach to timing. Conceptually, our two batches of 20 females might have laid 100 eggs each, leaving a total of 4000 ova to overwinter. Allowing for 90% predation in the early stages, 400 adults might emerge in 2008, 200 being females; a five-fold increase over the number released in 2007. That would be a firm foundation for the future, but such projections can be over-optimistic!

And, until we get Nature's judgement – perhaps in five years from now, we will not know whether doing everything by the book has guaranteed success for *argus*, but we are sure that we took best advice for this attempt at re-establishment within the Species Action Plan.

Another five years will probably also suffice to discover whether *iris* is properly established in East Suffolk. I wish it every good fortune, and hope that the colony can survive without regular re-inforcement, as has so often been necessary with *iris* elsewhere in UK.

Readers might consider my address premature, but at least now they will be able to chuckle if my properly planned attempt fails, and the freelance introduction succeeds.

Acknowledgements

The author is grateful to David Mason of the Suffolk Wildlife Trust for his assistance throughout the translocation project, to Nick Blacker for his work surveying and identifying the ant species, to John Quinn for providing background information on the release of *Apatura iris*, and to all the colleagues who permitted the use of their imagery in support of the reading of this paper.

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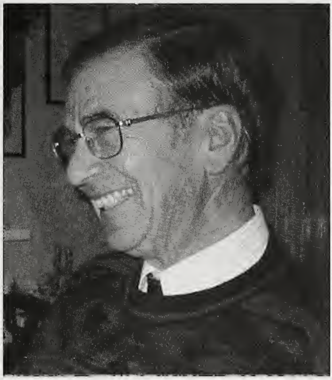
Peter Hodge
BENHS President 2007–2008



I grew up in East Sussex where my Father was Engineer and Manager of the small gas works at Uckfield until it closed in the mid-1950s, shortly after nationalisation of the industry. Our home backed onto a field containing the gas holder, surrounded by an area of unimproved grassland that supported an abundance of wild flowers, butterflies and other insects. A retired farmer who needed the hay to feed his carthorse during the winter, cut a varying proportion each summer and this resulted in a perfectly managed wildlife meadow.

At that time I was still at primary school and had exclusive access to this wonderful habitat. With the aid of the Observer's Books of Butterflies and Larger Moths I soon learnt the names of several common species and my older cousin, who had made a small butterfly collection, gave me his setting boards, a small store box and a Watkins & Doncaster catalogue. My life as an entomologist had begun!

Upon my transfer to the brand new secondary modern school I met Clive Cosham, one of several school friends who shared my interest in butterflies and moths. Clive's father worked night shifts at the Decca Navigation Station near East Hoathly and would bring moths home that were attracted to light. We were given exclusive permission to enter the private land surrounding the tall navigation mast, which consisted of a large expanse of mature heathland, surrounded by forest. The mast was actually in the centre of Vert Wood (known locally to us as "The Decca") and was of course the locality for the now extinct Lewes Wave moth. However, we did not associate South's published locality, cited as "some heathy ground in the Lewes district", with "the Decca" because, to our young minds, "the Lewes district" could not possibly be so far away as seven miles from the town centre. So, unfortunately, we never did find this elusive moth, which in four year's time would be exterminated by habitat destruction. Nevertheless we were very pleased to discover both Silver-washed and High Brown Fritillaries, White Admiral and Clouded Buff moths to name but a few.

Many early spring and autumn evenings were spent catching moths by patrolling the mercury vapour street lights along the Eastbourne Road south of Uckfield where Clive lived. That we could safely do this on the main A22 highway is a stark reminder that 50 years ago there really was very little traffic on the roads during the hours of darkness.

In 1957 the Cosham family emigrated to Nova Scotia and I was left to pursue my entomology alone. Not surprisingly after a couple of years my interest declined and was replaced by a craze for fishing, a hobby that was shared by many school friends.

It was not until summer 1967 that a young relative asked me to show him where to find some of the butterflies I'd shown him as set specimens. This acted as a perfect catalyst to rekindle my interest in entomology and I was hooked again!

In 1968, I met Roger Dumbrell in that famous Victorian hunting ground known as Abbots Wood. Although he declared his interest was Coleoptera it was another three years before I turned my attention to this Order of insects and for three years we both operated garden mv light traps and regularly compared notes on species of moths we recorded.

In 1969 I married and left Uckfield to live in Ringmer. In 1971, Roger finally persuaded me to turn my attention to beetles and I am so grateful to him for acting as my mentor. For the next four years we made regular collecting trips into the Sussex countryside and upon our return we always carefully compiled lists of species that we were able to identify.

Another keen young Sussex entomologist was Richard Jones, a past President of this Society, who regularly accompanied us in our search for interesting beetles. Roger was tragically killed in a motorcycle accident in July 1998, aged 50, but I acquired his collection of insects several years previously and this still serves as a reminder of the happy times we spent together in pursuit of our hobby.

In May 1989 I decided to terminate my career with British Telecom in order to concentrate on entomological consultancy work, a job that I still continue to this day, albeit on a part time basis. Most importantly I am able to confirm that becoming a professional entomologist did not dampen my enthusiasm to pursue my hobby as an amateur although this was something I did worry about when I made my career change.

After many years of confining myself to the study of British insects my life suddenly changed when, in May 1998, I was fortunate enough to be invited by former President Dr Mike Wilson to take part in an entomological survey of the Quinta de Marin nature reserve near Olhao in the Portuguese Algarve. Since then I have visited southern Portugal every year and have accumulated an extensive collection of beetles that include many species apparently new to Portugal, all as yet unpublished though.

In 2003 I took part in a BENHS field trip to Slovenia, again organised by Mike Wilson, one of the aims being to establish a working relationship between the BENHS and the Slovenian Entomological Society. Our hosts were exceptionally generous and provided transport and guidance to many interesting entomological sites.

In May 2008 I had the pleasure and satisfaction of organising my own entomological trip overseas, to the s'Albufera nature reserve in north-eastern Mallorca. The aim was to increase the knowledge of the poorly recorded insect orders: Coleoptera, Hemiptera and Hymenoptera. The venture was a great success and almost every participant said they would go again if invited.

Although when looking back through the list of past Presidents it is quite hard to find one without the seemingly obligatory string of letters after their name, I am very grateful that the Society did not discriminate when making their choice this year. Certainly the job will test my ability. I do, however, consider the position to be a great honour and I certainly intend to serve the membership to the best of my ability.

I joined the BENHS in 1978 when I declared my interests as ‘Coleoptera, Heteroptera and Diptera’ and aculeate Hymenoptera and Auchenorrhyncha can now be added to the list. Obviously it is impossible to become an authority on all the insects within these groups but nevertheless it has been a pleasure to acquaint myself with just a few families and if my observations have helped solve just one piece of the entomological jigsaw puzzle then I consider my efforts have been worthwhile.

BOOK REVIEWS

Atlas of the Seed and Leaf Beetles of Britain and Ireland by Michael L. Cox. 344pp 240 × 180 mm. Designed and published for the Centre for Ecology and Hydrology by Pisces Publications, 2007. ISBN 978-1-874357-35-3. Soft back £24.95 (plus £5.00 postage and packing).

The scope of the book is introduced in Chapter 1: the species covered include the Bruchidae (seed beetles) and the Chrysomelidae (leaf beetles). Worldwide the Bruchidae comprise about 1300 described species; currently the 'British List' only extends to 15 species of which only about half are likely to be encountered 'in the wild'. The Chrysomelidae is amongst the largest of the beetle families, worldwide comprising about 35,000 described species. Analysis of the current checklist indicates the current number of species in the three families so far recorded in Britain should be 258. Unfortunately, the Atlas causes some confusion in that Table 1 refers to 211 species, page 1 of the text refers to 263 species, and the rear cover refers to 216 species.

Next follow eight chapters which consider methods of collection of adults and studying their breeding cycles, their economic importance to agriculture, horticulture and forestry and their potential as biological control agents, environmental change assessment, and threat status and species/habitat conservation.

There are eight coloured plates (47 species – photographs by Roger S. Key) which illustrate the diversity of the shape and form of a representative sample. This section of the book concludes with a systematic synonymic checklist embracing the additional species (and deletions) and nomenclatural changes since Pope's 1977 checklist.

The declared intention of the Atlas is to present a provisional summary, for the first time, of information known about the distribution and ecology of seed and leaf beetles in Britain and Ireland, and to summarise the geographical distribution of each species. This is comprehensively achieved in the bulk of the Atlas (271 pages) which is devoted to the individual species accounts and provisional distribution of all resident species, principally based upon a summary of the Seed/Leaf Beetle Recording Scheme since its inception in 1980 as supplemented by published journal sources, museum and institutional collections and local atlases. A page per species is generally allocated and includes a good-sized grid map plotting all the records at 10-km centres; also details of habitat, local and world distribution, threat status of species, life cycle and host plants, together with information on parasitoids, parasites and predators. The book concludes with a comprehensive Bibliography, Index and two Appendices detailing sources both of records from museum collections, and also data used to compile information regarding world distribution.

Although many of the leaf beetles are fairly large and 'showy', the group also contains large numbers of closely-related small species which are regularly encountered in the field and which can be difficult to accurately identify without recourse to dissection; they represent a real challenge to even experienced coleopterists. The Atlas does not include identification keys, but sources the most current reliable published keys available, which together with the large amount of biological detail and the useful description tips for the identification of many species, will hopefully motivate and inspire more accurate identification and make the validation of records less onerous.

The Atlas is the culmination of many years of long-standing collaboration between the Natural History Museum and the Biological Records Centre and the publication

represents an important and lasting contribution to our understanding the complexity of the group. This excellent book is eminently readable and is recommended to both the serious coleopterist, and, hopefully will be an encouragement to the general naturalist with an interest in these beautiful beetles. My copy will certainly be in regular use, although I would have preferred rather more 'durable' hardbacked copies to also be available.

NORMAN HEAL

Scotland's Beginnings: Scotland through time by Michael Taylor & Andrew Kitchener. (National Museums Scotland, Edinburgh, 2007). Softback £8.99. ISBN 978-1-901663-26-6.

This book, like the National Museums of Scotland exhibition 'Beginnings' which inspires it, traces Scotland's journey across the globe, and the changes in its landscape and wildlife over the years. The first half of the book, a geological perspective, begins some 650 million years ago in the Precambrian when 'Scotland' was under an ice-laden sea near the South Pole. Snapshots track the country's changing life and climate as it creeps northwards, over the Equator, towards the North Pole, as it still does today. The changing climates, from cold through hot to cold again, explain why Scotland's rocks bear remains of subtropical rainforests, coral reefs and arid deserts. Each section covering this journey is lavishly illustrated with superb colour photographs and modern graphics. A large section is devoted to the ice ages and recent climatic conditions. The second half of the book, entitled Scotland's Wildlife, concentrates on post-glacial changes in the flora and fauna. The techniques of pollen analysis and radiocarbon dating that are used to reconstruct past habitats are neatly explained. There are short chapters on relict and endemic species: the latter exemplified by Scottish primrose *Primula scotica* which is confined to the most northerly rim of Scotland's mainland and the Orkneys. There are summary accounts of the main habitats found in Scotland today – forests and woodland, seas and shores, freshwater and wetlands, mountain and moorland and urban and farmland. Unfortunately, the illustrated examples from the fossil record and present-day wildlife are of the 'BBC variety' – mammals and birds (occasionally flowers) and the only insects illustrated are the Large Heath *Coenonympha tullia* and the long-horned beetle *Rhagium bifasciatum*. This is a surprising omission since many peat deposits are packed with subfossil invertebrates and some of our most beautiful insects exist as Scottish island races. This doesn't detract from what is otherwise a superbly-illustrated, information-packed booklet. A strong feature of the book is the inclusion of many excellent photographs of named localities with information about their wildlife, which makes you want to jump straightaway into your car and head for Scotland.

JOHN BADMIN

BENHS INDOOR MEETING

11 September 2007

The tenth Brad Ashby memorial lecture meeting in conjunction with the London Natural History Society was held in the Kings Cross Methodist Church hall. The meeting was chaired by Colin Bowlt.

Mr K. MERRIFIELD showed a giant wood wasp, *Urocerus gigas* (L.) found alive on 18.v.2007 in a guesthouse at Castle Acre, Norfolk. It had probably emerged from a basket of logs that was in the room.

Mr R. HAWKINS showed a live jumping spider *Marpissa muscosa* (Clerck) (Salticidae) found 6.ix.2007 in a house at Horley, Surrey. It may have been accidentally brought back from a field trip. He also showed a larva of the Mother Shipton moth, *Callistege mi* (Clerck) that had been killed by a parasitoid. The parasitoid had emerged and spun a cocoon across the caterpillar's body. This was collected at Ottershaw, Surrey on 28.viii.2007. Mr Hawkins' third exhibit was a hawthorn stem showing the larval tunnelling and protruding pupal case of the Leopard moth, *Zeuzera pyrina* (L.). This was found in a garden at West Humble, Surrey in 2007.

Mr A. J. HALSTEAD showed some photographs taken in September 2007 of a fuchsia plant damaged by fuchsia gall mite, *Aculops fuchsiae* (Kieffer) in a garden at Portchester, Hants. This is the first record of this devastating pest of fuchsias in Britain. Infestations cause severe distortion of the flowers and foliage at the shoot tips.

The following persons were approved as members: Dr James Parrack, Mr Colin Lucas, Miss Elizabeth Gabbott, Dr Ursula Rowlatt, Dr Johannes Bergsten, Mrs Sarah J Hart, Mr Alan Roscoe, Mr Adam Wilcox, Dr Gerard McGowan, Mr Niklas Lonnell. The Wildlife and Conservation Division of the Isle of Man government was approved as a Corporate Member.

Dr OLIVER CHEESEMAN spoke on 'A history of insect conservation in Britain'. He outlined how the British Isles and its fauna had been shaped by the ice age periods. Britain has about 22,500 insect species with only a few endemics. The natural distribution of habitats and species has been disrupted by agriculture and other human activities. The study and recording of British insects did not really begin until the 18th century. At that time there was an awakening of interest in the natural world, helped in part by the development of microscopes. The work of Linnaeus and others helped to bring some order to the naming of species and their arrangement into Orders and Families. The first British entomological society was the Aurelian Society which was active in London in the 1730s and 40s. The Entomological Society of London, which later became the Royal Entomological Society, was founded in 1833. The British Entomological and Natural History Society had its origins in the South London Entomological and Natural History Society, which began in 1872.

During the 19th century, Britain underwent an increasing degree of agricultural intensification and industrialisation, which was accompanied by a migration of people from the countryside into towns and cities. Towards the end of that century, organisations dedicated to the conservation of plants, animals and the countryside became established. In 1896 the Entomological Society of London set up a committee to consider insects in danger of extinction. In 1925 this became a Committee for the Protection of British Lepidoptera and in 1931 it was widened to cover all British insects. Later, in 1951, under the auspices of the Royal Entomological Society, this became the Conservation and Protection of British Insects Committee. In 1968 this committee became the Joint Committee for the Conservation of British Insects (JCCBI) and it involved a wider constituency than RES members. In 1992 the committee's title was widened by changing "Insect" to "Invertebrates". Another organisation, Wildlife Link, was established in 1980 to provide a forum for discussion on conservation matters and to respond to government consultations. In 2000 this became Invertebrate Link, which currently has representatives from 32 organisations.

Dr Cheesman then outlined some key challenges that have faced insect conservation in recent times. Insect collecting is necessary for accurate identification and the study of insect populations but it has a bad image problem. With the exception of a few rare and habitat specific species, it is unlikely that collecting will have a damaging effect. Collecting has helped to produce the base line data that has provided information on the abundance and distribution of species, and how this is changing. In 1897, the Entomological Society of London produced a statement of principles on insect collecting. The JCCBI produced a Code for Insect Collecting in 1972 and this was updated by Invertebrate Link in 2002. The second half of the twentieth century has seen the establishment of recording schemes for many insect families, which have helped to highlight species that are increasing or declining in abundance and/or distribution. The JCCBI has produced several Reviews of Scarce and Threatened Species. For some of the endangered species, Biodiversity Action Plans have been put in place to study the ecology of the insects and devise management strategies to secure their future.

Habitat loss and fragmentation of habitats has become a major problem, especially in the second half of the twentieth century. Nature reserves, National Parks and country parks have been set up to conserve wildlife but it is also necessary to conserve wildlife in the wider countryside, including urban areas. There is a need for more knowledge on the ecology of insects and the effects of changes in land management.

The general public is relatively uninformed about insects; much of their knowledge comes from shock horror stories in the press or from outlandish Hollywood films. There is a need for entomologists to promote insects and the invaluable roles they play in every habitat.

The problems of insect conservation are likely to increase as more land is taken up for housing or industrial developments. Agriculture is likely to become more intensive again as rising grain prices result in setaside land being brought back into cultivation. Climate change is likely to have profound effects. Some native species may be lost but it is also likely that new species will spread to Britain from southern Europe. At a time when the need to study insects has never been greater, there has been a rapid decline in the number of British universities offering courses in Entomology or taxonomy which is to be regretted.

BENHS FIELD MEETINGS

RHS Garden, Wisley, Surrey, 30 September 2006

Leader: **Ian Sims**. – This field meeting was a follow-up to the one held here on 15 October 2005 (*Br. J. Ent. Nat. Hist.* **19**: 265). During last year's meeting, several important species of leaf-mining Microlepidoptera were found, but most were represented by vacated mines. Distinctive as these were, it was felt that rearing the adults would provide indisputable evidence of their occurrence at this site. It was hoped that this year's slightly earlier date would increase the chances of finding occupied leaf mines, and subsequently rearing the adults.

A total of five members and guests met the leader in the car park on a cloudy and overcast morning, which remained this way for much of the day.

On entering the Garden we walked to an arboretum with a mature planting of native and exotic trees. Here a mine of *Etainia decentella* (Herr.-Schäff.) was found in a green sycamore (*Acer pseudoplatanus*) key. Many of the more common species of leafmining Lepidoptera found the previous year were also seen here, including *Stigmella hemargyrella* (Kollar) mining beech (*Fagus* sp.), *Stigmella salicis* (Stainton) mining goat willow (*Salix caprea*) and *Ectoedemia minimella* (Zetterstedt) in birch (*Betula* sp.). *Lyonetia clerkella* (L.) was particularly abundant. Hawthorn (*Crataegus* sp.), birch, rowan (*Sorbus aucuparia*), apple (*Malus* sp.), sallow and several species of exotic evergreen shrub were all being attacked by the larvae; adults were on the wing and numerous descending larvae and distinctive cocoons were found. Of the Gracillariidae, *Caloptilia stigmatella* (Fabr.) was probably the most numerous representative, its distinctive cones being seen on almost every willow and sallow examined.

As lunch approached we made our way back to the entrance area of the Garden under darkening skies. No sooner had we got under cover to eat than the heavens opened and a torrential storm ensued. This lasted for around three-quarters of an hour, during which Andrew Halstead, the Royal Horticultural Society's principal entomologist, joined our group.

After lunch we worked the river bank nature reserve that we visited the previous year. This time we experienced showers interspersed with brief sunny spells. Larval folds of *Caloptilia falconipennella* (Hübn.) were still in evidence on alder saplings. An additional record to last year was *Phyllonorycter comparella* (Dup.). Several mines of this species were seen in the foliage of white poplar (*Populus alba*) and grey poplar (*P. canescens*) saplings, and the leader succeeded in rearing it to adulthood a few weeks later. At this locality *Etainia louisella* (Sirc.) was found mining green keys of field maple (*Acer campestre*) and *Stigmella aceris* ((Frey) mining the leaves. Unfortunately, once again we were too late for this species as all the mines had been vacated at least a week or more earlier. No doubt this was the result of the hot dry summer that had preceded this spell of cool and damp weather.

The meeting closed at 16.00h, with a total of 34 species of leaf-mining Microlepidoptera having been recorded during the course of the day, but few new records compared with last year's list. A full species list has been sent to the Royal Horticultural Society.

Wray Cleave, Devon, 12 May 2007

Leader: **Roy McCormick**. – The week's weather had been pretty awful and the day did not look promising, but pre-arranged dates quite often turn out like this. Ten turned up for the event and after sorting out the people who could leave their vehicles near the field entrance, those with equipment made their way across the fields to the woodland that clothes the hills either side of this scenic part of Devon. As it had not long stopped raining, with what looked like more to come, dusking was conducted without knocking the herbage and little was observed with only a couple of each of; *Xanthorhoe montanata* (D.& S.) (Silver-ground Carpet), *X. spadicearia* (D.& S.) (Red Twin-spot Carpet) and *Petrophora chlorosata* (Scopoli) (Brown Silver-line) being seen. Four traps were set up along the one available track; more could have been put out, but as the weather did not look good and with rain in the air it was decided not to commit ourselves to more. There were few species coming in on each round of our traps, but the rain did at least hold off and around midnight our total had only reached 36; this woodland can be very productive and several very good species can be found here, but not this night. The best species seen were: one

Triaxomera fulvimitrella (Sodoffsky), a very attractive species; one *Cyclophora punctaria* (L.) (Maidens Blush); one *Lampropteryx otregiata* (Metcalfe) (Devon Carpet), the best moth of the night and 50 *Eilema sororcula* (Hufn.) (Orange Footman), which obviously had its peak emergence. The temperature held at around 8°C which was not too bad considering the night, and despite this the people who came enjoyed the experience.

Kiddens Plantation, Haldon, Devon, 2 June 2007

Leader: **Roy McCormick**. – Again the weather forecasters got it all wrong; there was supposed to be cloud cover, but it turned into a mostly clear night. Nevertheless 14 people from all the organisations invited turned up to a very good meeting. As I was going to Ireland the following day, I could not stay too long, but in any case we did not leave the site until 01.00 h. Dusking was carried out after the traps had been set. A few species were seen at this time including three *Angerona prunaria* (L.) (Orange Moth); two *Xanthorhoe montanata* (D.& S.) (Silver-ground Carpet); several *Petrophora chlorosata* (Scopoli) (Brown Silver-line) and one *Lomographa temerata* (D.& S.) (Clouded Silver). There was plenty of room for all the people who had brought equipment and we used ten traps altogether spread out along all the available tracks; the site is large, with a small established pond nearby and mixed conifer and deciduous woodland with wide tracks, so plenty of mixed habitat. The list built steadily with the few rounds we could put in, and as usual, the Common Swift moths were first to appear with over 100 being recorded, mostly from traps away from the pond. Several species of common tortrix and pyralid were seen along with the commoner lutestrings, geometrids, arctiids and noctuids, but no hawk-moths. We finished up with a list of 77 species with the best of these: two *Cyclophora annularia* (Fabr.) (Mocha); one *Eupithecia tantillaria* Boisduval (Dwarf Pug); one *Aplocera plagiata* (L.) (Treble-bar); one *Paradirisa consonaria* (Hübn.) (Square Spot), a late specimen; one *Atolmis rubricollis* (L.) (Red-necked Footman), the best moth of the night; one *Acronicta alni* (L.) (Alder Moth) and four *Pseudoips prasinana* (L.) (Green Silver-lines). The temperature stayed at around 11°C despite the clear night; some of our number decided to leave early around 23.00h, but everybody had an enjoyable evening.

Dunsdon Farm, Devon, 4 August 2007

Leader: **Roy McCormick**. – Brian Bewsher and the leader arrived at the car park, late, to find one other car parked; the thought was that this was going to be a Field Meeting of three, but I received a message from my wife that Rob Wolton was attending as well. As we had a fair way to go before we reached the site, my collapsible barrow was made ready and loaded with our equipment and, as it was mostly level, Brian opted to push the load to the recording site. Brian had one trap and I had three, and because it did not look a favourable night these were set up near to the end of the board walk; in the meantime Rob, who had been dusking in the adjacent fields, had arrived. Margaret Lavell and Mike Meehan turned up soon after, so at least we had half a field meeting with the five of us. The evening was a bit chilly and the sky had cleared although our forecasters said it would be overcast (wrong again), because the area is a culm measure, when the lights were started our first arrivals were hordes of flies, but moths started to trickle in and the flies died back although we ingested a few on the first rounds of the lights. Of the 60 species seen only seven were in double figures, these were: *Cydia splendana* (Hübn.); *Euthrix*

potatoria (L.) (Drinker); *Xanthorhoe ferrugata* (D.& S.) (Dark-barred Twin-spot Carpet); *Scotopteryx chenopodiata* (L.) (Shaded Broad-bar), Rob had netted several of these dusking; *Phragmatobia fuliginosa* (L.) (Ruby Tiger); our old thug, *Noctua pronuba* (L.) (Large Yellow Underwing), we had around 60 of these and *Mythimna impura* (Hübn.) (Smoky Wainscot). The rest of the 53 species were in single figures, with the best of these: 1 *Anacampsis populella* (Clerk): 6 *Lampropteryx otregiata* (Metcalfe) (Devon Carpet); 4 *Mythimna pudorina* (D.& S.) (Striped Wainscot); 1 *Ipimorpha retusa* (L.) (Double Kidney), the best moth of the night and 1 *Schrankia costaestrigalis* (Stephens) (Pinion-streaked Snout). The temperature stayed at around 12°C, but because the moth numbers tailed off around midnight it was decided to call it a night and we left the site at around 01.00 h.

Exminster Marshes, Devon, 11 August 2007 (National Moth Night)

Leader: **Roy McCormick.** – The car park was nearly full when I arrived, and as other people turned up they were finding it difficult to find a space – we had chosen a night when there was a barbeque at the Turf Locks Hotel which fortunately finished at 21.00 h. Of the eleven people who came to this event, only two had lights; I put my three along the main track (now a cycle way) with Bob and Di Dark putting their two in a field nearby. The forecast had again said it would remain overcast, but it cleared although it did remain reasonably warm, around 13°C. The lights were started and as you would expect with all the water about, hordes of caddis flies formed a cloud above each trap; fortunately these died back after a couple of hours (though none was recorded). Ten species of the 61 recorded were in double figures, these were: *Cydia splendana* (Hübn.); *Elophila nympheata* (L.) (Brown China-mark); *Nymphula stagnata* (Donovan) (Beautiful China-mark); *Cataclysta lemnata* (L.) (Small China-mark), this species was very common with around 70–80 of both sexes seen; *Noctua janthe* (Borkh.) (Lesser Broad-bordered Yellow Underwing), several of these were looked at to see if there were any *N. janthina* (D.& S.) (Langmaid's Yellow Underwing) among them; *Mythimna impura* (Hübn.) (Smoky Wainscot); *Apamea ophiogramma*, (Esper) (Double Lobed); *Archanara dissoluta* (Treitschke) (Brown-veined Wainscot), mostly small specimens and *Plusia festucae* (L.) (Gold Spot), we had around 20 of these. Strange that we only saw 6 *Noctua pronuba* (L.) (Large Yellow Underwing). Out of the other 51 species recorded, the best of these were: 1 *Catoptria falsella* (D.& S.), a very worn specimen; 6 *Parapoynx stratiotata* (L.) making this the final China-mark of the four to be seen; 1 *Semiaspilates ochrearia* (Rossi) (Yellow Belle), a strange one to be found on a site like this; 1 *Arctia caja* (L.) (Garden Tiger), a big female; 6 *Euplagia quadripunctaria* (Poda) (Jersey Tiger), one of the target species; 3 *Mythimna straminea* (Treitschke) (Southern Wainscot); 1 *Acronicta aceris* (L.) (Sycamore); 3 *Archanara geminipuncta* (Haworth) (Twin-spot Wainscot) and 2 *Earias clorana* (L.) (Cream-bordered Green Pea). By around 23.30 h, moths had practically ceased coming in, and as some of the people had decided to leave having enjoyed the evening, it was decided to pack up around midnight, leaving the site around 01.00 h.

Watersmeet, Devon, 24 August 2007

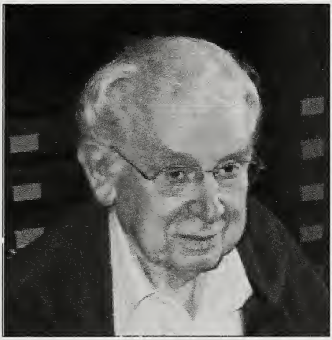
Leader: **Roy McCormick**. – This was supposed to be another clear night but it was felt that we had to work this site to establish the presence of *Diarsia dahlii* (Hübn.) (Barred Chestnut). I had arrived early and it was not until around 20.30h that the others started to arrive (for a moment I thought I had come on the wrong night). The

main objective was to blanket cover the Two Moors Way where the original capture of *D. dahlii* had taken place on National Moth Night 2006. Steve Hatch took my equipment up this track and dropped it off a good way up, he then carried on to put his trap lights out. Alan Jenkins put his couple of lights at the bottom of the track and Rob Wolton tucked a couple of actinics in trees near the road. Peter Franghiadi, as he had planned to stay the night, went to the Hillsford Bridge area where he could run his lights and tuck his vehicle away from the road along the track. Steve had run traps at this site the previous night, where he had seen one *D. dahlii* but not managed to retain it. He said that the moths coming in were infrequent and in low numbers and the same applied to this night. The list for this track totalled 47 species with most of them in singles with only five of these making double figures, there were: *Dipleurina lacustrata* (Panzer); *Eudonia truncicolella* (Stainton); *Eudonia mercurella* (L.); *Idaea aversata* (L.) (Riband Wave) and our thug, *Noctua pronuba* (L.) (Large Yellow Underwing). Every time we visited the lights we would record one or two new species, whereas at one point we could stand chatting by Alan's lighted sheet and see nothing fly in for several minutes. We stuck this out until 00.30 h before deciding enough was enough, Steve left his lights running while he assisted the leader to pack up and then going back to close his lights down with Alan doing the same; no sight of *D. dahlii* occurred during this process. However Rob's actinics brought in species that did not come to our mv lights. At the end, the best of the Two Moors way sightings were: 1 *Orthopygia glaucinalis* (L.), only the second record for VC4; 4 *Cymatophorima diluta* (D.& S.) (Oak Lutestring); 1 *Chloroclysta citrata* (L.) (Dark Marbled Carpet); 1 *Colostygia olivata* (D.& S.) (Beech-green Carpet); 1 *Rheumaptera undulata* (L.) (Scallop Shell), to Rob's actinic; 3 *Abraxas sylvata* (Scopoli) (Clouded Magpie), we can only assume these were part of a second brood as they were found in Peter Franghiadi's trap as well, and 1 *Furcula furcula* (Clerck) (Sallow Kitten), a very late specimen. The only saving grace for the night was one *D. dahlii*, a worn specimen in one of Peter's traps at the Hillsford Bridge site which came in around 00.30 h. We left the site around 01.30 h with the knowledge that Barred Chestnut was out earlier, around the beginning to middle of August and that it was probably thin on the ground in the more open areas of woodland at Watersmeet.

REVIEW

Publications of the National Centre for the Study and Conservation of Forest Biodiversity, Verona, Italy. The Centre has published two new softback volumes in its forestry series: *Canopy analysis and dynamics of a floodplain forest* by Gianelli, D. *et al.* (2007) and *Piano di gestione della Reserva Naturale Statale e Sito Natura 2000* "*Bosco della Fontana*" by Campanaro, A. *et al.* (2007). The former describes various aerial reflectance and GPS methods used for identifying and mapping individual broad-leaved forest trees and building up a 3-D model of forest stands. It includes a paper on measuring tree growth following defoliation by the sawfly *Tomostethus nigritus*. The latter volume describes the fauna and flora of major conservation concern in Bosco della Fontana.

OBITUARY



Sydney Wilfred Humphrey 1921–2007

Sydney Humphrey, who died on 4 December 2007, after a short illness, had been a member of our Society since 1947, when it was then known as The South London Entomological & Natural History Society. Having been a member for over fifty years he enjoyed the status of Special Life Member.

Syd was born in Roade on the outskirts of Northampton on 1 August 1921, where his father and grandfather were the village blacksmiths, he was a bachelor and lived in Roade all his life. He worked for only one employer, a Roade Company called Pianoforte Supplies, starting in the Drawing Office and progressed through to the position of Sales Manager. The company made piano parts such as pedals, but during the 1939–1945 war, they produced metal parts for aeroplanes and other war vehicles. Syd was also very active in the Roade Methodist church and had a strong Christian faith, being a Methodist lay preacher for fifty years and a Sunday School teacher for sixty years. The theatre, in particular Shakespeare, was of special interest to him and he often enjoyed visiting the London theatres and the Shakespeare Memorial Theatre at Stratford-upon-Avon in the 1950s and 60s. Syd was also an avid stamp collector, amassing a very fine and comprehensive collection of British and British Colonial stamps and he also built up a large collection of British coins.

Somehow Syd still found time to be a most successful breeder of British hybrid birds, specialising in the finches and became national champion at numerous exhibitions. However, he told me that his proudest moment was being declared national champion at Olympia for a remarkable Bullfinch/Redpoll hybrid. He also kept chickens and visitors to his home were invariably presented with a carton of freshly laid eggs to take home for breakfast!

Everything Syd undertook was executed in a most painstaking and fastidious manner. When he decided to trace his family tree, which he accomplished going back to before the reign of Henry VIII, not only did he compile an album of facts, certificates, drawings and photographs to demonstrate his findings, he replicated in meticulous detail the complete family tree on one large wall of an upstairs room of his home, Peartree House.

In view of all these activities it is of no small wonder that Syd was most successful in making a remarkable collection of British butterflies. He first became interested in butterflies in 1938, travelling widely in England to the recognised collecting sites such as Cumberland for *Erebia epiphron* and North Cornwall for *Maculinea arion*. He collected with well-known collectors such as R. E. R. Sanderson and Col. S. H. Kershaw, who bequeathed his moth and part butterfly collection to Syd. Kershaw once described Syd as "a very active, determined and patient man", this fact being amply demonstrated by his account to me of his first capture of *arion*. Wanting a few specimens for his collection and to see this magnificent butterfly on the wing, in 1940 Syd booked a holiday for the second week in July at Bude in North Cornwall with every expectation of encountering *arion*.

He returned home at the end of the week a disappointed man not having seen a single specimen. This was repeated every year for the next four years but he never encountered his quarry. Not until his holiday in 1945 did he see his first *arion*, a female, which with one excited sweep of the net, he missed! Syd was somewhat dismayed to see her dart into the middle of a large tangle of brambles. Most mortals would have given up at this point, but not Syd. He produced from his haversack a pair of secateurs and over the following two hours slowly and carefully dismantled the bramble bush until he was able to 'box' his first *arion*.

Syd told me of another occasion where he considered the collector's most valuable asset, luck, came into play. He had been invited by R. E. R. Sanderson to accompany him on a collecting trip to Royston, a locality Syd had never before visited, to search for *Polyommatus coridon* aberrations. The year was 1941 when *coridon* was still found in large numbers at this location. Arriving in Royston, Sanderson left Syd to his own devices and, not really knowing what to do or where best to go, he stayed close to Sanderson's car and examined the grasses nearby for newly emerged adults. When Sanderson finally returned Syd was able to show him a most remarkable male *ultraradiata* that he had observed drying its wings. Feeling somewhat overwhelmed by Sanderson's reaction of incredulity over this magnificent specimen, Syd felt duty bound to present it to him. Sanderson's response was "I've never seen a specimen like it before or ever likely to see one again, I'll take it". Syd always regretted parting with that rare and spectacular insect and on the death of Sanderson wondered what would happen to that particular butterfly, until one day he received a visit from one of Sanderson's executors who handed him a box with the words "Mr Sanderson left instructions that this butterfly rightly belongs to you". Syd was re-united with his *ultraradiata*.

Syd was an industrious collector and would think nothing of cycling to Monks Wood to look for *Satyrium pruni* and return home the same day, a round trip of over 100 miles. He was also a successful breeder and a good proportion of his collection was made up from the results of his breeding. His collection was set out in meticulous fashion and his setting was of the highest standard. Each butterfly was set in the Paisley method on setting boards that he made himself, one butterfly to each board and he used feathers to move their wings into the desired position, so avoiding any undue damage.

The Kershaw moth collection is now in the ownership of Peter Tebbutt, a BENHS member, and Kershaw's butterflies, along with Syd's own collection, is now with the writer.

With the passing of Sydney Humphrey our Society has lost yet another enthusiastic and knowledgeable lepidopterist. He will be sadly missed by all who had the privilege of knowing him.

Malcolm Simpson

THE SOCIETY'S PUBLIC LIABILITY INSURANCE

In 1997 the Society extended its third party liability insurance for cover in respect of official Society events to include field work carried out by members as part of their personal activities. It was expected that this would cover the insurance obligations, which accompany applications for collecting and recording permits in many cases.

The Society has received a number of queries regarding the scope of the cover provided and this notice will hopefully clarify the position.

At events arranged by the Society and its sister organisations, Dipterists' Forum, BMIG, and BWARS, public liability insurance is in place which covers injury and damage to third parties arising from the activities of members and guests. Events include both field meetings and indoor events such as workshops and exhibitions. The cover provided is £5,000,000. It is important that permits for field meetings are issued in the name of the Society, or sister organisation, or to an individual on behalf of the Society, not in the name of the leader of the meeting.

The Society's insurance policy also provides £5,000,000 of public liability insurance to individual members of the Society and sister organisations, in respect of their own field work and entomological research which is not part of a Society activity, providing this is undertaken in the United Kingdom and is not carried out with a view to financial reward.

Members who are contemplating carrying out field work on a paid basis are specifically excluded from this cover. We have now procured an arrangement by which such members can approach our brokers directly to obtain individual third party liability cover under our policy. This will incur the payment of an additional premium by the member concerned. We understand this will result in a very marked saving compared with obtaining this cover through a fresh policy.

We must emphasise that the cover referred to above is Public Liability Insurance and does not include Professional Indemnity, for which separate arrangements have to be made.

The Society's insurance policy number is,

Royal Insurance H2/RKE274258-7.

Our brokers are,

John Ehrhardt
Lansdowne Insurance Brokers
Bracken House
14–16 Christchurch Road
Bournemouth, BH1 3NJ
(Tel. 01202 291161)

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY
VOLUME 21, PART 2, JUNE 2008

March 2008 ISSN 0952-7583 Vol. 21, Part 1

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY

BRITISH ENTOMOLOGICAL & NATURAL HISTORY SOCIETY

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY
Published by the British Entomological and Natural History Society and incorporating its Proceedings and Transactions

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British Journal of Entomology and Natural History is published by the British Entomological and Natural History Society, Dinton Pastures Country Park, Davis Street, Hurst, Reading, Berkshire RG10 0TH, UK. Tel: 01189-321402. The Journal is distributed free to BENHS members.

Typeset by Tavistock Digital Data, Tavistock, Devon.
Printed in England by Henry Ling Ltd, Dorchester, Dorset.

BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY
Registered charity number: 213149

The Society arranges a programme of talks on Saturdays at various locations in Great Britain and a joint evening lecture with the LNHS in London in September. In addition, workshop meetings are held at the Society's headquarters and the well-known ANNUAL EXHIBITION takes place in the autumn. The 2008 Exhibition is planned for Saturday 8 November at Imperial College, London SW7. Frequent Field Meetings are held at weekends in the summer. Visitors are welcome at all meetings. The current Programme Card can be obtained on application to the Secretary, J. Muggleton, at the address given below.

The Society maintains a library and invertebrate collections at its headquarters in Dinton Pastures, which are open to members on various advertised days each month. The Society's web site, http://www.benhs.org.uk, has the latest news.

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Society Website: www.benhs.org.uk for recent information on the Society's meetings programme and general society details.

Cover photograph: The Oak Beauty *Biston strataria* (Hufn.) (Geometridae), Perry Woods, Kent, 7.iii.2008. Photo: John Badmin.

NOTE: The Editor invites submission of photographs for black and white reproduction on the front covers of the journal. The subject matter is open, with an emphasis on aesthetic value rather than scientific novelty. Submissions can be in the form of colour or black and white prints or colour transparencies.

INVERTEBRATES OF ACIDIC SEEPAGES ON DARTMOOR, ENGLAND

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Abstract

Quantitative sampling was undertaken along transects on three mire seepage systems on Dartmoor during April in two years to search for the larvae of the rare hoverfly *Eristalis cryptarum* (Fabr.). Although the hoverfly was not detected several nationally rare or scarce species were found frequently in the seepages, including the cranefly *Triogma trisulcata* (Schummel), the snail *Omphiscola glabra* (Müller) and the water beetles *Laccobius atratus* (Rottenberg), *Helochares punctatus* Sharp, *Hydrochus angustatus* Germar and *Paracymus scutellaris* (Rosenhauer), along with nine other uncommon wetland species. Ordination and classification of the data showed there were two distinct groups, one associated with faster open runnels and another with dense vegetation usually dominated by *Sphagnum auriculatum* Schimp.

Introduction

The work described here arose incidentally from a study of the autecology of the rare RBD2 hoverfly *Eristalis cryptarum* (Fabr.) which is listed in the UK's Biodiversity Action Plan (UK Biodiversity Group, 1999; Drake & Baldock, 2004, 2005). The larvae of this fly are thought to live in or close to seepages where the adults are found, so searches of the seepages were undertaken to find the larva. Although no *E. cryptarum* larvae were found, other species in the samples were identified in the expectation that they would help describe the fauna with which the hoverfly was associated.

The aquatic fauna of streams and rivers is exceptionally well known, and that of headwaters has been recognised as valuable (Furse *et al.*, 1991, 1993; Smith *et al.*, 2001) but the aquatic fauna of seepages appears to have been almost entirely neglected (e.g. Armitage, 1982) except for some high-profile species such as southern damselfly *Coenagrion mercuriale* (Charpentier) and several snails in the genera *Vertigo* and *Catinella* (Colville, 1999; Purse, 2002; Speight *et al.*, 2003). In contrast, the 'terrestrial' fauna of seepages, notably adult flies and beetles, is well known to the extent that seepages are recognised as holding particularly interesting and often rich assemblages (Boyce, 2002). This note is a contribution to describing the neglected aquatic component of seepages at three Dartmoor sites where *E. cryptarum* has good populations.

Sites and methods

Sites

Dartmoor is a large, predominantly granite upland in the south-west of England experiencing rainfall greater than 1500 mm each year. Three sites were studied in the catchment of the East and West Webburn rivers, two being typical seepages on gently sloping hillsides and the third being a floodplain swamp. The Challacombe Farm (320 m OD) seepages occupied relatively sheltered land set close to *Salix cinerea* L. (grey willow) scrub in well-grazed Rhos pasture. A complex mosaic of

Fig. 1 Transect C, 22 April, Pizwell, Devon. Photo: M. Drake.

small seepages fostered particularly diverse vegetation. Faster runnels were *Hypericum elodes – Potamogeton polygonifolius* soakways (M29) of the National Vegetation Classification (Rodwell, 1991) with adjacent *Molinia caerulea – Potentilla erecta* mire (M25). Small areas were dominated by *Menyanthes trifoliata* L. (bogbean). Pizwell (340 m OD) was more typically exposed moorland edge, where a broad seepage ran down about 400m of gently sloping hillside (Fig. 1). Most was moderately heavily grazed *Carex echinata – Sphagnum recurvum/auriculatum* mire (M6) with runnels of M29. Smoothmoor (225 m OD) was a flat swamp dominated by bogbean and *Carex nigra* (L.) Reichard (common sedge) and appeared to be an extreme variant of M29. The swamp occupied an area about 150 × 50 m, entirely sheltered by surrounding wet woodland and carr. Water flowed very slowly through the entire swamp and its depth was remarkably even across the site, although falling from about 10 cm in early spring to just saturated peat by late summer.

Perrett (2000) measured water temperature and pH at a runnel at Challacombe Farm between late May and mid September 2000. It was 12–13°C in late May, rising a little in June but remaining remarkably steady between 14 and 18°C until early September, with higher temperatures reflecting warmer air temperature. The runnel was slightly acidic, being pH6.2 in mid May and showing a very slight increase in acidity through the summer, although remaining between pH5.4 and 5.8 in this period.

Challacombe Farm and Smoothmoor are private land with no public access. Challacombe Farm and Pizwell are in SX67 and Smoothmoor in SX77; detailed grid references have been withheld at the request of Dartmoor National Park Authority as these are prime sites for *Eristalis cryptarum*.

Field methods

Samples were taken at 1m intervals along straight transects of 10 m (2003) or 5 m (2004) at seepages where adult *E. cryptarum* had been seen in the year previous to each survey. The transects covered a range of water flows and vegetation types, and included the centre and edges of seepages. Sometimes the transects ran into the *Sphagnum* banks bordering the seepages. Each sample was gathered by gently scooping vegetation and debris into a flour sieve, then 'pond-netting' the resulting hole in the vegetation using the sieve. A 'quadrat' approximately 30–40 cm across was sampled (sometimes smaller in dense, almost water-free vegetation), and the collected material occupied about 0.5–1.5 litres in a polythene bag.

The percentage cover of conspicuous plants and the amount of open water was estimated at each point before the sample was taken. In 2004, water depth was estimated approximately (e.g. 2 or 5 cm) and flow estimated on an ordinal scale of 0 (no discernible water movement), 1 (slight movement of silt when disturbed) to 2 (water clearly moving).

The samples were sorted live in the laboratory by rinsing the whole catch through a coarse sieve and searching the fine fraction bit-by-bit in a white tray. The search was primarily for *Eristalis* larvae and other invertebrates were identified incidentally to the project, so not every invertebrate was removed and some numerous common species (notably the stoneflies *Nemoura cinerea* (Retzius) and *Nemurella pictetii* Klapalek) were not separated. Some wetland species that do not have aquatic larvae, for example chrysomelid and staphylinid beetles, were also identified.

Between 17 April and 30 April 2003, 70 samples were taken at Challacombe Farm and 30 at Pizwell, and between 20 and 30 April 2004 25 samples were taken at Challacombe Farm, 45 at Pizwell and 25 at Smoothmoor. The results for a species are expressed as a percentage occurrence in any of these five sets of samples.

National statuses allocated by the Joint Nature Conservation Committee were obtained from Bratton (1991), Falk (1991), Kirby (1992), Hyman & Parsons (1992, 1994) and Foster (in prep.). Statuses for several water beetles mentioned here will be revised downwards in the forthcoming review which employs the IUCN criteria; these are quoted alongside the existing statuses where a change is proposed (Foster, in prep.).

DATA ANALYSIS

The relationship between the species composition of different samples was investigated using ordination (discriminant analysis). The method allocates scores to samples such that those with the most similar composition have the most similar scores. This is done in a series of stages, with the first stage seeking the arrangement of samples that gives the greatest possible separation (referred to as the first axis), and the next seeking the next best arrangement but with least reference to the first (second axis), and so on. A plot of the scores of two different axes gives a visual representation of the closeness of samples. Any trends in environmental conditions that may explain the pattern of samples can be investigated by correlating the scores against the variables.

Ordination was undertaken using detrended correspondence analysis (DECORANA), since this method is best for exploring whether there is any pattern at all (Hill, 1979a; Lepš & Šmilauer, 2003). The analysis used presence-absence data, with no downweighting for species that were scarce in the dataset. As most variation in

the samples is usually explained by the first two ordination axes, the relationship between samples was shown graphically for these axes only.

A second method, constrained ordination, includes in its analysis a correlation of the sample (and species) scores against environmental variables. This method was also used but it added no new insight to that obtained using DECORANA so the results are not presented.

Samples were classified into groups having the most similar species composition using the program TWINSPAN (Hill, 1979b). This method is based on ordination. Starting with the entire dataset, it divides the samples into two groups whose overall compositions are most dissimilar. It continues dividing the groups until instructed to stop or they become too small to be worth dividing. In practice, the method is good at identifying the major groupings in a dataset but successive divisions often become less ecologically realistic, so ecological common sense and knowledge of the species need to be used to identify groups that appear to be real ecological entities. Presence-absence data were used, and no species were excluded. Three samples containing no species were omitted from the analysis (two from Challacombe in 2003 and one from Pizwell in 2003).

Datasets for each of the three sites and two years were analysed separately and in combination (that is, all samples from both years for each site, and all samples from Challacombe and Pizwell for each year). Ordination and classification were undertaken using the software packages Ecom and CAP (Pisces Conservation Ltd, 2002, 2004).

To identify environmental variables that may explain any trends in species composition, the variables were correlated with sample ordination scores using Spearman's rank correlation, which is a non-parametric method that makes few assumptions about the statistical normality of the data. The characteristics of groups identified by classification were described in terms of the environmental variables. Differences between the median values of the variables of each group were tested using the non-parametric Mann–Whitney test for pairs of values, and a Kruskal–Wallis test for three values.

RESULTS

Dominant species

A total of 78 species and another nine taxa identified to a higher level were recorded from the 195 samples; about half of which were beetles (Table 1). A few species were frequent at all three sites. The stonefly *Nemoura cinerea*, whose records included a moderate proportion of *Nemurella pictetii*, dominated all three sites and was present in 79–100% of samples. The caddis *Limnephilus lunatus* Curtis was present in 32–51% of samples in 2004, but was completely absent in 2003. There were two acidophilic hydrophilid water beetles, *Helophorus flavipes* (Fabr.) which was found in 12–53% of samples and was least frequent in the swamp, and *Helochares punctatus* Sharp which was found in 7–60% of samples and which showed wide variation between years. Species that were frequent at the hillside seepages of Challacombe Farm and Pizwell were *Pyrrhosoma nymphula* (Sulzer) (large red damselfly) and *Orthetrum coerulescens* (Fabr.) (keeled skimmer dragonfly), the mayfly *Leptophlebia marginata* (L.), and the water beetles *Agabus paludosus* (Fabr.), *Anacaena lutescens* (Stephens), *Laccobius atratus* (Rottenberg) and *Dryops luridus* (Erichson), all of which were usually present in at least 15% of samples. Many of these are typical of more acidic conditions. The fauna of the swamp at Smoothmoor

Table 1. Percentage occurrence of species recorded at three sites in 2003 and 2004.

Species	Family/group	Status*	Challacombe 2003	Challacombe 2004	Pizwell 2003	Pizwell 2004	Smoothmoor 2004
Number of samples →			70	25	30	45	25
Coleoptera							
Oodes helopioides (Fabr.)	Carabidae	Nb					4
Chrysolina brunsvicensis (Grav.)	Chrysomelidae		3		3	9	
Hydrothassa glabra (Herbst)			1				
Plateumaris discolor (Panzer)						2	
Plateumaris sericea (L.)						7	4
Prasocuris phellandrii (L.)			6	20	10	36	
Coccidula rufa (Herbst)	Coccinellidae						4
Dryops luridus (Erichson)	Dryopidae		19	4	10	2	
Agabus affinis (Paykull)	Dytiscidae		1	4			
Agabus bipustulatus (L.)			4				
Agabus larvae				4		18	40
Agabus paludosus (Fabr.)			13	16	3	16	8
Dytiscus larva				4	7	7	16
Hydroporus gyllenhali Schiödte				12		2	4
Hydroporus obscurus Sturm			23				
Hydroporus pubescens (Gyllenhal)					7	2	
Helophorus brevipalpis Bedel	Helophoridae		3		3	2	
Helophorus flavipes (Fabr.)			41	28	53	33	12
Limnebius truncatellus (Thunberg)	Hydraenidae			4	7	4	
Hydrochus angustatus Germar	Hydrochidae	Nb		8	7	9	
Anacaena globulus (Paykull)	Hydrophilidae		3	12			8
Anacaena limbata (Fabr.)							48
Anacaena lutescens (Stephens)			27	4	17	9	40
Cercyon ustulatus (Preyssler)		Nb (LRlc)					4
Chaetarthria seminulum (Herbst)/ *C. simillima* (Vorst & Cuppen)		Nb	1				
Coelostoma orbiculare (Fabr.)			4	4	17	38	32
Enochrus fuscipennis (Thomson)			1		3	2	8
Helochares punctatus Sharp		Nb (LRlc)	7	16	60	38	24
Hydrobius fuscipes (L.)							8
Laccobius atratus (Rottenberg)		Nb	39	24	60	42	
Laccobius bipunctatus (Fabr.)				4			60
Laccobius colon (Stephens)							12
Paracymus scutellaris (Rosenhauer)		Nb	9	16	3	7	
Cyphon padi (L.)	Scirtidae		1				
Elodes larva			4				4
Microcara testacea (L.)			1				
Stenus bifoveolatus Gyllenhal	Staphylinidae						8
Stenus latifrons Erichson				4		2	4
Stenus melanarius Stephens				8		2	12
Stenus oscillator Rye		Nb				18	
Stenus picipennis Erichson						2	
Diptera							
Dixella martinii (Peus)	Dixidae					4	
Triogma trisulcata (Schummel)	Cylindrotomidae	pRDB3	3	12	10	11	12
Pedicia rivosa (L.)	Pediciidae			12		2	
Prosimulium	Simuliidae			4			
Simuliidae					3		
Simulium latipes (Meigen)		uncommon		4			
Anasimyia lunulata (Meigen)	Syrphidae	Nb	13		3	2	4
Eristalinii						4	12
Melanogaster hirtella (Loew)							16
Neoascia tenur (Harris)						2	
Tabanidae	Tabanidae		6	4	7	22	32

Table 1. *(Continued)*

Species	Family/group	Status*	Challacombe 2003	Challacombe 2004	Pizwell 2003	Pizwell 2004	Smoothmoor 2004
Ephemeroptera							
Leptophlebia marginata (L.)	Leptophlebiidae		39	44	30	73	
Hemiptera							
Sigara venusta (Douglas & Scott)	Corixidae				3		
Hebrus pusillus (Fallén)	Hebridae	Nb			3	20	
Hebrus ruficeps (Thomson)			7	4		18	16
Hydrometra stagnorum (L.)	Hydrometridae					2	
Microvelia reticulata (Burmeister)	Microveliidae					24	
Chartoscirta cincta (H-S)	Saldidae					2	8
Chartoscirta cocksi (Curtis)							4
Odonata							
Orthetrum coerulescens (Fabr.)	Libellulidae		26	36	60	82	
Pyrrhosoma nymphula (Sulzer)	Coenagriidae		33	48	53	27	
Plecoptera							
Leuctra nigra (Olivier, 1811)	Leuctridae		6				
Nemoura cinerea (Retzius)/ *Nemurella pictetii* Klapalek	Nemouridae		79	100	80	91	96
Trichoptera							
Beraea pullata (Curtis)	Beraeidae			8			68
Adicella reducta (McLachlan)	Leptoceridae			4		16	
Limnephilus hirsutus (Pictet)	Limnephilidae					16	
Limnephilus lunatus Curtis				32		51	44
Limnephilus marmoratus Curtis							4
Limnephilus sparsus Curtis						4	4
Plectrocnemia conspersa (Curtis)	Polycentropodidae		24	32		2	20
Tricladida							
Polycelis sp						13	92
Polycelis felina (Dalyell)			1				
Crustacea							
Asellus meridianus Racovitza	Amphipoda				10	18	4
Crangonyx pseudogracilis Bousfield	Isopoda						84
Hirudinea							
Erpobdella testacea (Savigny)							52
Glossiphonia complanata (L.)						22	44
Haemopis sanguisuga (L.)			1	4	3	4	16
Helobdella stagnalis (L.)						2	4
Mollusca							
Galba truncatula (Müller)	Lymnaeidae			12		11	4
Lymnaea palustris (Müller)					13		
Omphiscola glabra (Müller)		RDB2	3	40	23	13	4
Radix balthica (L.)			4		3	2	60
Pisidium	Sphaeriidae		19		20	4	8
Succinea putris (L.)	Succineidae						28
Vertigo antivertigo Drap.	Vertiginidae						4

* Status definitions. Nb – Nationally scarce category Notable B: species occurring, or thought to occur, in 30–100 10 km squares of the British National Grid. RDB2 – Red Data Book 2 (Vulnerable): taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating (species declining through their range, in vulnerable habitats or whose populations are low). pRDB3 – Provisionally Red Data Book 3 (Rare): taxa with small populations that are not at present Endangered or Vulnerable but are at risk (species existing in 15 or fewer 10 km squares of the National Grid). IUCN category LRlc – Lower Risk, least concern: taxa not considered to be at risk.

clearly differed from that of the hillside seepages, and here the most frequent were common species of more mesotrophic conditions and which were scarce or absent in the seepages of the two more upland sites. The most frequent of these were the seepage-dwelling caddis *Beraea pullata* (Curtis), the water beetles *Anacaena limbata* (Fabr.) and *Laccobius bipunctatus* (Fabr.) and the ubiquitous wandering snail *Radix balthica* (L.) previously known as *Lymnaea peregra* (Müller).

Nationally uncommon species

A number of nationally rare or scarce species were found, and some were sufficiently frequent to suggest that upland seepages were a stronghold for them. The most interesting was the mud snail *Omphiscola glabra* (Müller), with Red Data Book 2 (vulnerable) status. It was present at all three sites but was especially frequent at the hillside seepages of Challacombe Farm and Pizwell. The median water depth where the snails were taken was 5 cm (range 0–8 cm) compared to a median of 2 cm for places where it was absent (2004 data only), suggesting that it preferred deeper parts of the seepages. The percentage cover of purple moor-grass (*Molinia caerulea* (L.) Moench) was rather higher in samples with the snails (45% cover with snails present, 10% without).

The rare (provisionally RDB3) cylindrotomid cranefly *Triogma trisulcata* (Schummel) was reared from pupae collected in several samples. It was found at all three sites at a frequency of 3–12% at each site, usually at the higher frequency, so was clearly a common insect here. The median water depth where it occurred was 2 cm, compared to 4 cm for samples in which it was absent. The larvae feed on moss, but there was no difference in the percentage cover of *Sphagnum* or other unidentified mosses of samples with or without the fly (2004 data).

Of the remaining nationally scarce species, one suite consisted of species expected in slightly acidic seepages, and another consisted of species associated with more mesotrophic conditions (Foster, 1987). In the acidic group, some water beetles have already been mentioned as being quite frequent (*Laccobius atratus*, *Helochares punctatus*), while others were *Paracymus scutellaris* (Rosenhauer) and *Hydrochus angustatus* Germar in the two hillside seepage sites, and *Cercyon ustulatus* (Preyssler) in the swamp. The scarce *Sphagnum* bug *Hebrus pusillus* (Fallén) and the commoner *H. ruficeps* (Thompson) were moderately widespread at the exposed Pizwell seepages.

The purpose of this study was to locate the larva of *Eristalis cryptarum*. As the larva was undescribed, the aim was to rear any eristaline larvae found to confirm their identity. Several eristaline larvae (rat-tailed larvae) were found but the only two that were successfully reared were of the scarce *Anasimyia lunulata* (Meigen). While adults of this fly were frequently seen at Smoothmoor, where several unsuccessfully reared eristaline larvae were found, adults were reared from Challacombe and Pizwell where adults were never seen in three years' surveillance for *E. cryptarum*. *Anasimyia lunulata* adults are normally associated with valley bogs, so the occurrence of larvae at the seepage sites was expected. No larvae large enough to be those of *E. cryptarum* were found; the search had been timed to coincide with the presumed period of maximum growth on the assumption that the species over-winters as larvae and not as pupae. None of the larvae found could be positively identified even to genus, using keys by Dixon (1960) and Rotheray (1993).

Assemblages

Visual inspection of the data showed that the assemblages at Smoothmoor were markedly different from those of the two more upland seepage sites, and an initial

Table 2. Spearman's rank correlation of variables with the first ordination axis score (with one significant value included for axis 2 scores).

	Challacombe 2003	Challacombe 2004	Pizwell 2003	Pizwell 2004
Open water	−0.62***	−0.34 ns	−0.39*	0.07 ns
Potamogeton polygonifolius	−0.44***	−0.5*	−0.40*	−0.05 ns
Depth	not measured	−0.33 ns	not measured	0.33*
Sphagnum	0.2 ns	0.3 ns	0.71***	−0.19 ns
Menyanthes	0.17 ns	0.45*	0.42*	0.35*
Sedge	0.11 ns	−0.27 ns	0.13 ns	0 [−0.33* for axis 2]
Molinia / grass		−0.13 ns	0.40*	0.03 ns

Where * = $P<0.05$, ** = $P<0.01$, *** $P<0.001$, ns = not significant.

ordination of samples from all sites sampled in 2004 confirmed this. The main differences are described above and there is no need for formal analysis to show that the swamp fauna differed from the hill-side seepages.

Ordinations of data from the two hill-side sites were first analysed using the data combined by year or by site. Differences due to either year or site dominated the first axis of the ordination, that is, most variation was explained by when or where the samples were taken rather than by differences in the nature of the seepages, so this analysis was unhelpful. Between-year variation was probably due to stochastic variation in the occurrence of some species, for instance, the common limnephilid caddis *L. lunatus* was particularly frequent at both Challacombe Farm and Pizwell in 2004 but absent in the previous year. Marked between-site differences were exemplified by the high occurrence of the hoglouse *Asellus meridianus* Racovitza, the bug *Hebrus pusillus* and the leech *Glossiphonia complanata* (L.) at Pizwell, which were absent from Challacombe Farm. The analysis was therefore repeated for each site and year separately, giving four separate analyses. This approach had the added advantage that any patterns common to all four datasets were likely to be real. Three of the four datasets indeed revealed similar patterns but the fourth from Pizwell in 2004 could not be interpreted ecologically, despite comprising samples from nine transects selected for their apparent contrast.

In both years at Challacombe Farm and at Pizwell in 2003, the percentage cover of either open water or bog pondweed (*Potamogeton polygonifolius* Pourr.) was significantly correlated with the first ordination axis scores (Table 2). For some datasets, the percentage covers of *Sphagnum*, bogbean or grass (usually purple moor-grass) were also significantly correlated but with the opposite sign, that is, they appeared to be related to the species composition of samples in the opposite way to open water and bog pondweed. As bog pondweed is typically frequent in the more open parts of seepages, and *Sphagnum*, grasses and other plants (including bogbean) are found at the margins or in slower-flowing or nearly still water, the correlations suggested that the main trend along the first axis was due to variation in plant structure; this in turn presumably reflected the underlying movement of water through the vegetation mat. The scores for the first two ordination axes for Challacombe Farm in 2003 are shown in Figure 2 as an example of one of the datasets, together with the trends explained by the main explanatory environmental variables.

Table 3. Percentage occurrence of the more frequently occurring species in the two major assemblage groups at Challacombe Farm in two years and at Pizwell in 2003. Numbers in bold indicate species selected by TWINSPAN as over-represented in a group. Species are grouped according to whether they were over-represented in Group 1 or Group 2, or showed no preference. The 'Total' columns give the actual number of samples (out of N = total for whole dataset) in which a species was recorded. Infrequent species are indicated as + (present) or – (absent).

	Challacombe 2003			Challacombe 2004			Pizwell 2003		
	Group 1	Group 2	Total (N = 68)	Group 1	Group 2	Total (N = 25)	Group 1	Group 2	Total (N = 29)
Species more often in Group 1									
Agabus paludosus (Coleoptera)	89	11	9	**75**	25	4	+	–	(1)
Coelostoma orbiculare (Coleoptera)	+	–	(3)	+	–	(1)	**100**	0	5
Helochares puncatatus (Coleoptera)	+	–	(5)	**100**	0	4	**83**	17	18
Helophorus flavipes (Coleoptera)	**100**	0	29	**86**	14	7	63	38	16
Laccobius atratus (Coleoptera)	**96**	4	27	**100**	0	6	78	22	18
Paracymus scutellaris (Coleoptera)	+	–	(6)	**100**	0	4	+	–	(1)
Prasocuris phellandrii (Coleoptera)	+	–	(4)	**60**	40	5	100	0	3
Dicranota sp1 (Diptera)	**90**	10	21				+	–	(1)
Leptophlebia marginata (Ephemeroptera)	**96**	4	27	**91**	9	11	**89**	11	9
Orthetrum coerulescens (Odonata)	**94**	6	18	**89**	11	9	**94**	6	18
Pyrrhosoma nymphula (Odonata)	**91**	9	23	**75**	25	12	**94**	6	16
Omphiscola glabra (Mollusca)	+	+	(4)	50	50	10	**100**	0	11
Species with no group preference									
Anacaena globulus (Coleoptera)	+	–	(2)	33	67	3			
Dryops luridus (Coleoptera)	54	46	13	+	–	(1)	100	0	3
Hydroporus obscurus (Coleoptera)	81	19	16	–	+	(1)			
Pedicia rivosa (Diptera)				33	67	3			
Triogma trisulcata (Diptera)	+	+	(2)	0	100	3	100	0	3
Nemoura cinerella/Nemurella (Plecoptera)	73	27	55	40	60	25	63	38	24
Oniscus asellus (Isopoda)	86	14	7						
Galba truncatula (Mollusca)				0	100	3			
Species more often in Group 2									
Pisidium (Mollusca)	25	**75**	16				**100**	0	7
Anacaena lutescens (Coleoptera)	68	32	19	+	–	(1)	20	**80**	5
Ormosia? (Diptera)	46	**54**	28						
Limnephilus lunatus (Trichoptera)				25	**75**	8			
Plectrocnemia sp (Trichoptera)	53	47	17	25	**75**	8			
Asellus meridianus (Isopoda)							0	**100**	3

Table 4. Median and upper and lower quartiles (in brackets) of important variables in Groups 1 and 2 for three datasets. Medians were tested using a Mann-Whitney test (* = $P<0.05$, ** = $P<0.01$, *** = $P<0.001$, ns = not significant).

Site and variable	Group 1	Group 2	Significance of difference in medians
Pizwell 2003			
Number of samples	20	9	
Number of species	8 (6–8)	4 (3–4)	**
% cover of open water	80 (80–80)	80 (60–80)	ns
Potamogeton polygonifolius	0 (0–5)	0	ns
Sphagnum	20 (10—50)	60 (50–80)	**
Molinia	0 (0-5)	20 (0–40)	ns
Challacombe Farm 2003			
Number of samples	47	21	
Number of species	7 (5–8)	5 (3–6)	**
% cover of open water	90 (85–100)	30 (10–90)	***
Potamogeton polygonifolius	0 (0–30)	0 (0–2)	ns
Sphagnum	20 (0–55)	10 (0–60)	ns
Carex	30 (10–80)	50 (0–100)	ns
Challacombe Farm 2004			
Number of samples	10	15	
Number of species	9 (9–10)	4 (3–5)	***
% cover of open water	25 (13–45)	5 (0–15)	**
Potamogeton polygonifolius	5 (5–10)	0	*
Sphagnum	0 (0–4)	5 (0–5)	ns
Carex	10 (0–18)	5 (0–10)	ns
Molinia	40 (23–71)	50 (10–83)	ns
Depth	5 (5–8)	1 (0–3.5)	*
Flow	1 (0–2)	0 (0–1)	ns

Classification of the samples produced two clear groups of species in three of the four datasets, but groups for Pizwell in 2004 appeared to be ecologically meaningless. The first division of the three meaningful datasets produced a similar split. One group was particularly well characterised by the dragonflies *Orthetrum coerulescens* and *Pyrrhosoma nymphula* and the mayfly *Leptophlebia marginata* in all three datasets, and by the water beetles *Helochares punctatus*, *Helophorus flavipes* and *Laccobius atratus* in two of the three datasets (Group 1 in Table 3). Even when the classification program did not select these beetles as being over-represented (not emboldened in Table 3), they still showed a preference for this assemblage. The same was true of the water beetles *Agabus paludosus*, *Coelostoma orbiculare* (Fabr.) and *Paracymus scutellaris* and the leaf beetle *Prasocuris phellandrii* (L.). The water snail *Omphiscola glabra* and larvae of the cranefly *Dicranota* sp. may also have belonged to this assemblage but the evidence was inconsistent.

The second group distinguished by the classification program was less clearly characterised, but key species in different datasets included the caddis *Limnephilus lunatus* and *Plectrocnemia* sp., which included *P. conspersa* (Curtis), the water beetle *Anacaena lutescens*, larvae of the cranefly *Ormosia* (or a related genus) and the

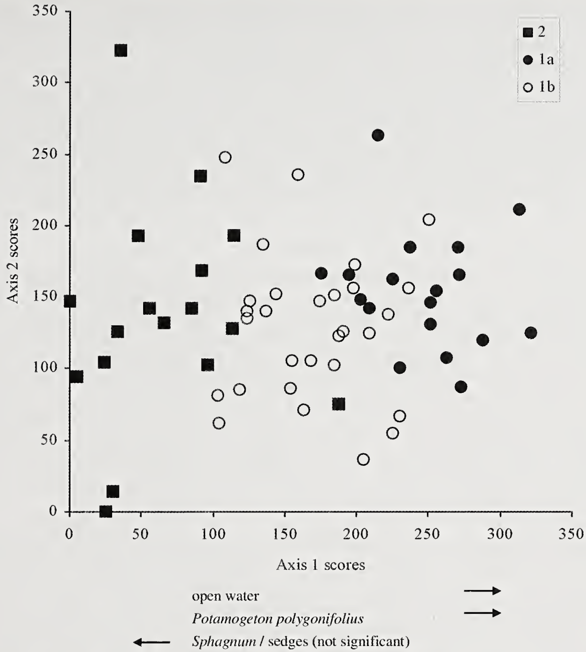

Figure 2. Plot of first two ordination axes scores of samples from Challacombe Farm, 2003, showing TWINSPAN groups and variables that correlated with axis 1 scores, with the direction of their trends. Points show TWINSPAN Group 1 (subdivided into 1a and 1b) and Group 2. (see Table 2 for significance of the variables).

hoglouse *Asellus meridianus* (Group 2 in Table 3). With the exception of *P. conspersa*, these species are usually found in still mesotrophic water.

Further divisions of each of these major groups were far less consistent between the three datasets. They are not discussed further because the number of samples was usually small and experience with classification programs suggests that these smaller groups are likely to be partly artefacts. However, the next division of Group 1 of Challacombe 2003 data is shown in Figure 2 to illustrate how the classification followed the main trends in environmental variables along the first axis.

The number of all taxa was always significantly greater in Group 1 than in Group 2 (Table 4), although, owing to the relatively rapid sorting for non-eristaline taxa, species richness was almost certainly lower than would be found in a dedicated survey. Of the nationally scarce and rare species in the three classified datasets, the beetles *Hydrochus angustatus*, *Laccobius atratus* and *Paracymus scutellaris*, and the *Sphagnum* bug *Hebrus pusillus* were found predominantly in the Group 1

assemblage, whereas the snail *Omphiscola glabra* and the cranefly *Triogma trisulcata* were found in both groups. It appeared, therefore, that the more clearly defined Group 1 assemblage also supported all the scarcer species, whereas the assemblage Group 2 of seepage margins supported fewer of them.

Only a few variables differed significantly between the two groups (Table 4). The percentage of open water was significantly greater in Group 1 at Challacombe Farm in both years (but not at Pizwell), being accompanied in 2004 by a significantly deeper water and higher cover of bog pondweed which is typically found in more open, faster-flowing runnels. *Sphagnum* had significantly greater cover in Group 2 at Pizwell. These results tended to confirm the correlations of ordination scores with the variables.

Discussion

In his review of the invertebrates of seepage habitat in England, Boyce (2002) concluded that acidic to neutral seepages are characterised by fewer nationally scarce or rare species than found in seepages on calcareous or soft-rock geology, and attributed this to the far wider occurrence of acid seepages. Nevertheless, the present results suggest that the acidic Dartmoor seepages at moderate altitudes may have considerable interest. The Dartmoor sites supported two of the three Red Data Book species in Boyce's list of key species of acid or neutral seepages, *Triogma trisulcata* and *Eristalis cryptarum*, and several other commoner species (*Chaetarthria seminulum* (Herbst)/*simillima* Vorst & Cuppen, *Laccobius atratus*, *Orthetrum coerulescens* and *Nemurella pictetii*). In addition, the Dartmoor seepages were important for *Hydrochus angustatus*, *Paracymus scutellaris*, and *Anasimyia lunulata* and the mollusc *Omphiscola glabra*.

The occurrence of several of the uncommon species on cool, acidic upland sites may appear unexpected as these conditions do not fit with their generally recognised ecology. The cranefly *Triogma trisulcata* is regarded as a northern species of mountain streams (Falk, 1991) but its frequent occurrence at the Dartmoor sites is not unsurprising given the similarity of the climate and geology to those of north-western Britain. The mud snail *Omphiscola glabra* has been recorded from eight sites in Rhos pasture in north-east Dartmoor in seasonal shallow pools, puddles and wet tracks that did not dry out completely during the year (Hughes, 1997). These sites appear to conform more with the seasonally dry or damp habitat with which *O. glabra* is normally associated, at least in southern Britain, and differ from the permanent seepages at Challacombe Farm and Pizwell which ran well all year from 1999 to 2004. The species is clearly more widespread and frequent than its RDB2 status suggests, as indicated by nearly 70 post-1965 records in the most recent atlas, although it appears to have gone from large areas of lowland England (Kerney, 1999). The hydrophilid water beetle *Chaetarthria seminulum* is usually associated with mesotrophic and base-rich water margins (Foster, in prep.), although Boyce (2002) included it in his list of key species of acid-neutral seepages. The almost-aquatic ground beetle *Oodes helopioides* (Fabr.) is usually associated with lowland water bodies and fens, and has not been recorded from Dartmoor and not recently from Devon (Luff, 1998). The rove beetle *Stenus oscillator* Rye is classified by Lott (2003) as a fen species; most of the records were of females which cannot be reliably separated from the common *S. tarsalis* Ljungh, but the few males found were all *S. oscillator*. A pupa of the uncommon blackfly *Simulium latipes* (Meigen) was found at Challacombe Farm in one of the fastest sections of an M29 runnel. Bass (1998) describes some of its localities as small temporary streams draining shallow ponds, so this record appeared to modify the currently understood ecology of the species.

These apparently unexpected records probably reflect somewhat limited recording in the inclement weather often experienced on higher ground on Dartmoor.

A large proportion of the seepage fauna comprised species associated more with still water than with streams, and there were notably few stoneflies, mayflies and caddis, and no freshwater shrimps *Gammarus pulex* (L.). Only ten of the species found are typical of flowing water, while four or five species (*Laccobius atratus*, *Stenus picipennis* Erichson, *Beraea pullata*, *Limnephilus hirsutus* (Pictet) and possibly *Plectrocnemia conspersa*) are regarded as particularly characteristic of seepages. The assemblage shared with the fauna of headwater streams the characteristic of low species richness and a large proportion of beetles, but fewer caddis (Furse *et al.*, 1993), but had little in common with that of small upland streams (e.g. Elliott, 1967; Rutt *et al.*, 1989). The seepage fauna included a large proportion of acidophiles, notably 13 species among the beetles (Boyce, 2004). Seepages therefore have a distinctly different fauna from that of streams and headwaters, and should not be treated as inferior aquatic habitats.

The seepage habitat was not uniform in structure, and this was reflected in the fauna. Two assemblages were recognised, one being well characterised by *Orthetrum coerulescens*, *Pyrrhosoma nymphula*, *Leptophlebia marginata* to a lesser extent by *Laccobius atratus*, *Helophorus flavipes* and *Helochares punctatus*, living in more open faster-flowing seepages. The second less well characterised group was found in areas dominated by more closed vegetation and especially by *Sphagnum*. A gradient presumably exists between these groups, and there were indications of this in the Dartmoor datasets. Less clear-cut results were obtained for the extensive and more-or-less continuous seepage at Pizwell compared to the mosaic of seepages and patches of mire at Challacombe Farm. This is reflected in the absence of ecologically meaningful groupings in one year's data and rather few correlations in the other year at Pizwell. Beetles such as *Helophorus flavipes* and *Laccobius atratus* that appeared to characterise more open areas of seepage at Challacombe often failed to show any preference for different TWINSPAN groups at Pizwell. Thus although some common trends were found by treating the datasets separately, there are still uncertainties about the consistency of dominant species in each assemblage.

It appears certain that the structure of the vegetation was probably as important as water movement in determining the composition of assemblages, although the strong correlations of the most clearly defined assemblage with bog pondweed indicated that water current must also be a key factor, even though current was not among the significant correlates. This plant is one of the most conspicuous members of runnels and fares poorly at the margins in slow flows where purple moor-grass and *Sphagnum* dominate.

Acknowledgements

This work was undertaken during a study of *Eristalis cryptarum* funded by Dartmoor National Park Authority (DNPA) and English Nature under the Species Recovery programme. Dr Norman Baldock (DNPA) commented on a draft, and Dr Mick Eyre and another referee provided valuable criticisms. The author thanks the land owners for permission to carry out the work.

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SHORT COMMUNICATIONS

***Globiceps fulvicollis cruciatus* Jakovlev (Hemiptera: Miridae) new to Cornwall and other records**. – A single adult of this plant bug was knocked from bushy heather *Calluna vulgaris* and western gorse *Ulex gallii* on Mulgram Hill, above Chapel Porth (SW6949) on the north coast of West Cornwall, 22.viii.2007. This new record for this striking bug represents the first report from Cornwall (Alexander, in press), although Kirby (1992) warns that an earlier record for *G. flavomaculatus* (Fabr.) may be erroneous, resulting particularly from confusion with *G. woodroffei* Wagner, not recognized in Britain until 1959 – the latter is now known as *G. juniperi* Reuter (Nau, 2006a). The earlier Cornish record for *G. flavomaculatus* – Kennack Sands (SW71), July 1963, R.T. Bannister – has not been checked but John Widgery (pers. comm.) has found this species more recently, at Cape Cornwall (SW33), 14.vii.2006. It clearly is a valid species for the county list. *G. juniperi* has not yet been found in the county.

Mulgram Hill lies within the extensive complex of coastal dry and humid heath south of St Agnes. This forms part of the Godrevy Head to St Agnes SSSI which is designated partly for its extensive maritime heathland and grassland, and partly for its rich invertebrate fauna – although the citation merely mentions a few widespread butterflies and dragonflies despite a much broader interest and an assemblage of more significant invertebrates including the famous moth *Phyllonorycter staintonella* (Nicelli) (Lepidoptera: Gracillariidae) discovered here new to Britain (Heckford, 1984) and the spider *Lathys stigmatisata* (Menge) (Araneae: Dictynidae) recorded here by Peter Merrett (pers. comm.) in 1968/69 and of very restricted occurrence in Britain (Bratton, 1991) – both species were known about before the citation was written and are inexplicably not mentioned.

Kirby (1992) provides a characteristically thoughtful discussion of what little is known about the bug's habitat requirements. He identifies the common factors as fairly open situations which are wet for at least part of the year. In dune slack situations the bug appears most associated with creeping willow *Salix repens*, while it has been found with bearberry *Arctostaphylos uva-ursi* and cranberry *Vaccinium oxycoccus* in the eastern Highlands. It would appear that the third common factor is the presence of dwarf shrubs, which may provide important food resources, egg-laying sites and/or refuges for when the water table is at its peak height. Eggs are

known to be laid in crevices in woody stems. It is often stated that creeping willow is a key feature of the sites but this plant is absent from many known sites, and the bug is thought to be largely predacious, so a strong association with a single plant species seems unlikely.

Nau's (2006b) draft keys to the Miridae make the separation of Britain's three *Globiceps* more accessible and all of my voucher specimens have recently been re-checked. Neither are new county records, but nonetheless merit recording as the species has Nationally Scarce status in Britain (Kirby, 1992):

West Sussex: Lavington Plantation (SU9418), one swept from humid heath, 3.vii.2002.

County Durham: Wanister Bog (NZ251489), Waldridge Fell SSSI, one swept from wet heath, 5.vii.2005.

Acknowledgements

The author would like to thank John Widgery for making his Cornish records available, Bernard Nau for access to his draft checklist and keys, and the Devon & Cornwall Region of the National Trust for commissioning the nature conservation evaluation of their land at St Agnes.

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Rain from a cloudless sky *or* a lot of spittle? – Reading a recent note (Badmin, 2007, Spittle sharing among froghopper species. *Br. J. Ent. Nat. Hist.*, **20**, 152–3) mentioning large spittle masses, reminded me of a bizarre and initially mysterious incident, which occurred in 2006 and was not resolved until 2007. Whilst surveying the Pagham Rife, West Sussex (SZ8797), on 3.vi.2006, I noticed that the surface of the stream beneath the overhanging willows was being dimpled by what appeared to be droplets of water. It looked as if it was raining (or had been) yet the sky was cloudless. A stiff breeze was blowing and it was rather humid. I left rather puzzled, and unconvinced by my 'theory' based on condensation of sea-breezes.

It was not until the next field season when the Rife was again visited, that all became clear. On the 23.v.2007 the willows were again dripping profusely, and the sky was clear and blue. This time armed with my trusty 10 × 42 binoculars, I peered into the trees, and bingo, cuckoo spittle!! Lots of it! I watched the foamy masses lengthen then drip into the stream. I could not reach any of the masses, which were scattered throughout the canopy of at least twenty trees, attached to the twiggy parts of the willows, though *Aphrophora* nymphs seem the most likely foamers. – Jonty Denton, 29 Yarnhams Close, Four Marks, Hants GU34 5DH.

THE SWARMING BEHAVIOUR OF *EPISYRPHUS BALTEATUS* (DE GEER) (DIPTERA: SYRPHIDAE)

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Abstract

Initial observations of the swarming behaviour of the male hoverfly *Episyrphus balteatus* (De Geer) were undertaken in a wood in west Northamptonshire (VC32), during July/August 2007. Basic equipment (a voice recorder) was used and several interesting aspects of the swarming behaviour of male *E. balteatus* were revealed. Clusters of sunlit leaves, located on the northern edge of the swarm site (lek) were found to be used as swarm markers. A maximum swarm population size of 20 is suggested and lek fidelity is posited. Frequency distributions of hovering, basking and chasing activities were constructed, revealing that the average swarming male *E. balteatus* spent nearly twice as much time hovering as it does basking and that both activities were interspersed with short conspecific and heterospecific chases. Several differences between the conspecific and heterospecific chases were noted, including a possible spiralling courtship flight pattern.

Introduction

Episyrphus balteatus (De Geer) is one of the most widespread and abundant British hoverflies (Dean, 1982; Chambers *et al.*, 1986; Ball & Morris, 2000). The species normally has a single generation in Britain, although up to three are thought possible (Hart *et al.*, 1997). Migrating northwards from warmer European countries in the spring, arrival in Britain typically takes place from late May onwards, depending upon weather patterns and aphid abundance (Ball & Morris, 2000). Numbers peak in July/August, making *E. balteatus* the dominant British aphidophagous syrphid. Large numbers of adults emerge in late summer, with the survivors migrating southwards in the autumn (Rotheray, 1989; Hart *et al.*, 1997). *Episyrphus balteatus* is known to have a low cold tolerance and has been suggested as being unlikely to be able to survive long in normal UK winter conditions (Hart & Bale, 1997). However, the species is found in the UK throughout the year (Ball & Morris, 2000), suggesting that either some adults do manage to overwinter and/or that eggs laid earlier in the season survive through to puparia, with emergence brought on by warm spells in the following year.

Episyrphus balteatus males are commonly found in swarms in woodland clearings, whereas females are frequently found in a wide variety of more open habitats, such as field margins, hedgerows, gardens and parks (Ball & Morris, 2000; Branquart & Hemptinne, 2000). Swarming in insects is generally a mating activity in which groups of males (from one to a thousand or more) hold station, usually with reference to a visual marker, and await the arrival of a receptive female (Thornhill, 1976; Sullivan, 1981; Blackwell *et al.*, 1992; Gullan & Cranston, 2005). Swarms are usually male, but the role is reversed in some species, such as the empid *Empis borealis* (L.), in which the females swarm and males visit to mate (Svensson & Petersson, 2000). A species whose swarming sites generally contain no resources that are important to the

females (such as suitable oviposition sites) and in which the males exhibit aggressive conspecific and heterospecific pursuit behaviour is said to have a 'lek' mating system (Gullan & Cranston, 2005). In this paper, the swarming sites of *E. balteatus* are referred to as 'leks' (Heinrich & Pantle, 1975), without implying the presence of a dominating hierarchy.

The majority of published papers covering the behaviour of *E. balteatus* discuss foraging and ovipositing, reflecting the agricultural importance of the species as an aphidophagous predator (Tenhumberg & Poehling, 1995; Macleod, 1999). Little has been published on the swarming behaviour of male *E. balteatus*. The swarming behaviour of Diptera can be separated into three distinct categories: basking, hovering and chasing (Heinrich & Pantle, 1975) and this paper describes some initial observations on these behavioural aspects of *E. balteatus*. The results are discussed and some ideas for further work are presented.

Methods

The study took place in Everdon Wood, which comprises the western part of a larger wood known as Everdon Stubbs (SP605566). The wood is located in west Northamptonshire (VC32), between the villages of Everdon and Farthingstone. One of the few remaining examples of semi-natural ancient woodlands in this part of Northamptonshire, Everdon Stubbs comprises approximately 29 ha of ancient woodland. Everdon Wood is the damper and lower lying part, comprising ash (*Fraxinus excelsior*), oak (*Quercus spp.*) and field maple (*Acer campestre*) and is classified as lowland mixed deciduous woodland (National Vegetation Classification type W8). Sweet chestnut (*Castanea sativa*), sycamore (*Acer pseudoplatanus*) and significant amounts of standing and fallen deadwood are also present.

An initial visit to Everdon Wood was undertaken in early July 2007 to determine the location and structure of the leks. Further visits to carry out the behavioural observations were made at various times, between 0900 and 1600 h, over 10 days during July and August 2007. A Sanyo ICT-B29X digital voice recorder, which has an integral digital counter with a 1-second resolution, was used to record the swarming behaviour. The basking, hovering, conspecific and heterospecific chasing times of individual males were noted, halting the recording whenever they either left the lek, or their flight became too difficult to follow. The recorded notes were transferred to a spreadsheet following each trip.

Results

Six leks with more than one resident were identified within the study wood. These leks were all located in sunlit glades, with the swarms occupying approximately 75 cubic metres and measuring typically 5 m (w) 5 m (l) 3 m (h). The population size of the swarms in these leks was always less than 20. Single males also established their own swarms in numerous smaller leks, with one swarm only per lek, located in smaller sunlit glades. All the multi-occupancy leks remained in use during the study period and no new leks were established. Adult *E. balteatus* are known to feed on both pollen and nectar (Cowgill *et al.*, 1993), but no sources of either were found at any of the leks.

Clusters of sunlit leaves were used as swarm markers, with one cluster per lek. The markers were located on a northerly lek boundary, with the upper side facing into the lek. Sycamore, hawthorn (*Crataegus spp.*) and ivy (*Hedera helix*) were all used.

Although the lek locations were static, the population sizes of their associated swarms were dynamic. As an example, one swarm population started with 15–20 individuals, reduced to 1 after three minutes, increased to 5, fourteen seconds later and up to 10 over the following minute. Leks were often vacant, typically for 5–10 minutes.

The behaviour of 108 individual flies was recorded, which resulted in 1373 timed periods of activity, totalling 8810.5 seconds. Hovering took up 55% (4867.5 s) of the total time, basking took up 29% (2545.5 s) and chasing took the remaining 16% (1397.5 s). Of the total time spent chasing, 43% (598.5s) was spent chasing conspecifics and 57% (799 s) was spent chasing heterospecifics. There was a statistically highly significant departure from homogeneity between the total hovering, basking and chase activity times (Table 1a). Compared to the total time spent basking, significantly more time was spent hovering and significantly less time was spent chasing (Table 1a). There was also a statistically highly significant departure from homogeneity between the total conspecific and heterospecific activity times (Table 1b). Significantly more time was spent on heterospecific chases than on conspecific chases.

The 1373 recorded events comprised 602 hovering, 264 basking and 507 chase events. The chase events comprised 171 conspecific chases and 336 heterospecific chases. There was a statistically highly significant departure from homogeneity between the total recorded number of hovering, basking and chase events (Table 2a). Compared to the total recorded chasing events, significantly more hovering events were recorded and significantly less basking events were recorded. There was also a statistically highly significant departure from homogeneity between the number of recorded conspecific and heterospecific chases (Table 2b). Significantly more heterospecific than conspecific chases were recorded.

The results revealed a peak time (mode) of 2 seconds for all three types of behaviour. The median basking time was 6 seconds, with an inter-quartile range of 3–13 seconds (Fig. 1). The median hovering time was 5 seconds, with an inter-

Table 1. Chi-squared analysis of each behavioural category, showing (a) the total recorded hovering, basking and chasing activity times and (b) the chasing activity times split into conspecific and heterospecific categories, shown in the 'Observed' rows. The tests assume an equal time spent for all categories, shown in the 'Estimated' rows (33.3% for the behavioural categories and 50% for the chase categories). Times are in seconds.

(a)

	Hovering	Basking	Chasing
Observed	4867.50	2545.50	1397.50
Estimated	2936.54	2936.54	2936.54
Cell χ^2	1269.54	52.07	806.61
	Test $\chi^2=2128$, df$=2$		

(b)

	Conspecifics	Heterospecifics
Observed	598.50	799.00
Estimated	698.75	698.75
Cell χ^2	14.38	14.38
	Test $\chi^2=29$, df $=$ 1	

Table 2. Chi-squared analysis of (a) the total recorded number of behavioural events, separated into hovering, basking and chasing categories and (b) the chasing events split into conspecific and heterospecific categories, shown in the 'Observed' rows. The tests assume an equal number of events undertaken for all categories, shown in the 'Estimated' rows (33.3% for the behavioural categories and 50% for the chase categories).

(a)

	Hovering	Basking	Chasing
Observed	602.00	264.00	507.00
Estimated	457.62	457.62	457.62
Cell χ^2	45.55	81.92	5.33
	Test $\chi^2 = 133$, df = 2		

(b)

	Conspecifics	Heterospecifics
Observed	171.00	336.00
Estimated	253.50	253.50
Cell χ^2	26.85	26.85
	Test $\chi^2 = 53$, df = 1	

quartile range of 2–10 seconds (Fig. 1). The median total chase time was 2 seconds, with an inter-quartile range of 2–3 seconds (Fig. 2). The median conspecific chase time was 2 seconds, with an inter-quartile range of 2–4 seconds, while the median heterospecific chase time was also 2 seconds, but with an inter-quartile range of 1–3 seconds (Fig. 2). Most periods of activity took less than 30 seconds; only 20 lasted longer, and these comprised 8 baskings, the longest being 59 seconds, and 12 hoverings, the longest being 67 seconds. The longest recorded chase lasted 28 seconds.

Behaviour within the swarms was not always uniform. Sometimes all swarm members were hovering, but different individuals were usually observed to be resting, hovering or chasing. Mating was never observed and all hovering individuals were identified as males.

Fig. 3 shows three minutes in the life of a male *E. balteatus*, demonstrating the occurrence of all three types of swarming behaviour. Hovering always took place before basking and often took place after basking. Individuals also hovered before leaving or entering a lek. Chasing interrupted both hovering and basking activities.

Discussion

Most swarms are formed with reference to a marker and although there are many types and sizes of swarm marker, they are usually visual and noticeable by human observers through their rarity or high contrast against the background or sky (Downes, 1969; Sullivan, 1981). In this study, *E. balteatus* swarms were found to use sunlit leaves as markers, with the position of the leaves on a northerly lek boundary making the marker a recognisable landmark of high contrast against the shady woodland backdrop. The presence of sunlit leaves in a suitable woodland glade makes the identification of a suitable lek a relatively easy task for the observant entomologist, but just what makes *E. balteatus* males decide that the location is

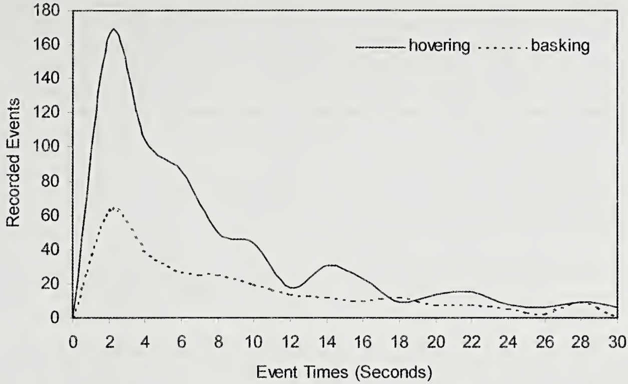

Fig. 1. Frequency distribution of the 264 recorded basking and 602 recorded hovering activity times of *Episyrphus balteatus,* from 0–30 seconds.

suitable is not clear. There were many sunlit leaves in the wood and not all were used as leks. This suggests that other factors, apart from a space for the swarm, are involved and it may be, for example, that the species of marker leaves is important.

The rapid variations in population sizes noted for the *E. balteatus* swarms matches those observed in other Diptera (Heinrich & Pantle, 1975; Sullivan, 1981; Yuval *et al.*, 1994). Male *E. balteatus* expend a large amount of energy during hovering and

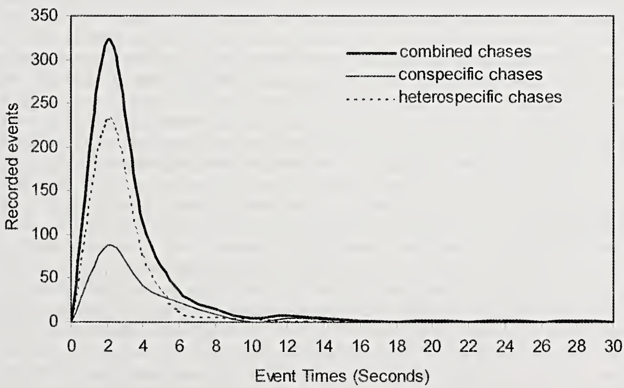

Fig. 2. Frequency distribution of the 507 recorded chase activity times of *Episyrphus balteatus*, comprising 171 conspecific and 336 heterospecific chase activity times, from 0–30 seconds.

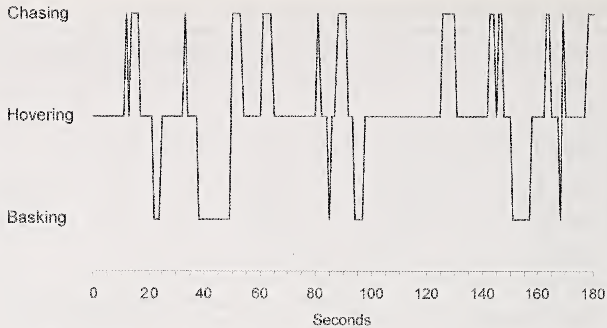

Fig. 3. Three minutes in the life of one *Episyrphus balteatus* male, showing the sequence of behavioural activities (basking, hovering and chasing) undertaken during swarming at a lek in the study wood.

chasing (Heinrich & Pantle, 1975), and it has been reported that their guts are completely devoid of pollen when dissected (Gilbert, 1981). Through forcing individual males to leave the swarm to feed, the lack of food sources at the leks in the study wood was seen as one likely reason behind the variations in swarm population sizes. It is easy to presume that departing males return to the lek after feeding, but this may not be so; Gilbert (1984), for example, posited that male *Syrphus ribesii* (L.) hoverflies were unlikely to return to the same swarm after feeding.

Whilst leaving the swarm to feed is one possible reason behind the variations in swarm population size, movement between swarms has been noted in other studies (Sullivan, 1981) and is another possible cause in this case. The larger swarms may be located at more favourable leks, presenting a greater chance of mating, but with correspondingly greater competition. As not more than 20 individuals were observed at any one lek, density factors may also encourage males to leave. The small single-occupancy leks present in the study wood may be used by males on their way between the larger multi-occupancy leks, in search of a swarm with less competition.

The frequency distributions of hovering and basking times were of a similar form (Fig. 1). Both behaviours revealed similar peak periods, medians and inter-quartile ranges, but there were significantly more recorded hovering events (Table 2) and when compared to basking or chasing, a significantly greater proportion of the total recorded activity time was spent hovering (Table 1). Hovering males have a greater chance of reaching a receptive female before basking males (Heinrich & Pantle, 1975), which was the assumed reason behind the large amount of time *E. balteatus* devoted to hovering in the study wood. This assumption was reinforced by the recorded behaviour of *E. balteatus* (Fig. 3.), which showed that hovering always followed chases, a behavioural trait which would enable males to re-assess the lek for further mating opportunities before engaging in activities with a lower chance of mating, such as basking or feeding. This behaviour suggests that hovering is triggered by conspecific competition, but as all three types of activity were observed to take place simultaneously at a lek, an alternative suggestion is that members of the swarm undertake hovering as an individual-based behaviour. Under this scenario,

conspecific competition would not influence hovering, which would be undertaken solely with the aim of intercepting females. To increase the chance of mating and to ensure that females do not pass through the lek unchallenged, any flying insect coming within perceptual range would be chased, on the chance that it is a receptive female, thus leading to both conspecific and heterospecific chases. The suggestion of individual-based lekking behaviour was boosted by the observation that single males with no conspecific competition, including those in the small single-occupant swarms, were observed to hover for similar times to members of the larger swarms. Individuals also hovered before leaving or entering a lek, possibly assessing which way to leave or other potential leks in the area and assessing the lek for suitability and competition levels on arrival. Hovering also took place just in front of the chosen marker leaf before the insect landed to bask, as they checked the leaf for predators and rival males.

Hovering has been shown to reduce body temperature. One example of the cooling effect of hovering is described by Gilbert (1984), who demonstrated that the body temperature of the syrphid *Melanostoma scalare* (Fabr.) declined as the insect was hovering, but when the insect stopped hovering and began basking, the reduction in body temperature ceased. In conjunction with hovering, air temperature also has an effect on body temperature. With high ambient air temperatures, *Syrphus* species, such as *S. ribesii,* have been shown to spend most of their time hovering, with more time spent basking and less time hovering as air temperature decreased (Heinrich & Pantle, 1975; Gilbert 1984). In other Diptera, such as *Anarete* midges, swarming frequency has been shown to increase in line with air temperature, indicating that body temperature can at least be maintained, and maybe even increased, by higher air temperatures (Chiang & Stenroos, 1963; Heinrich & Pantle, 1975). If the ambient air temperature is too low to maintain body temperature whilst hovering, then basking is used as an ectothermic activity, with a return to hovering when body temperature has been restored (Heinrich & Pantle, 1975). In cloudy weather, several *E. balteatus* males in the study wood were observed to hover when the sun was not shining, returning to their marker to bask immediately when the sun shone again. With *E. balteatus* being slightly smaller than *S. ribesii*, this indicates that *E. balteatus* does not use hovering to maintain body temperature, relying instead on ambient air temperature and basking. The return to the marker was therefore being used to restore the loss in body temperature caused by hovering in the shade. In this study, basking was often terminated by a period of hovering (Fig. 3), without an observed reason for initiating a chase, further indicating that the insect uses basking to restore heat loss. Basking has also been suggested as an energy saving tactic, employed to prolong the stay at a lek (Heinrich & Pantle, 1975; Gilbert, 1984). It is therefore likely that *E. balteatus* uses basking for energy saving as well as an ectothermic activity.

Most basking and hovering periods were within the 2–4 second range (Fig. 1); this was due to individuals interrupting both these activities to chase other flying insects that entered the lek (Fig. 3). Although significantly less time was spent chasing than either hovering or basking (Table 1a), such behaviour reflects the mating function of the swarm. The intruding insects were mostly other males and small flies, but other syrphid species and wasps were also chased. Both types of chase involved a fast approach to within recognition distance of the intruder, whereupon heterospecific chases were abandoned, with the individual returning to hovering or basking. Conspecific chases continued with both males undertaking a high-speed inter-twined spiral flight, but this was too fast to be accurately observed. Spiral manoeuvres were attempted with other syrphid species and wasps, but elicited no response, suggesting the spiral movement is species-specific and may be either territorial contest or a form

of courtship. There were significantly more recorded heterospecific chases than conspecific (Table 2b), but due to the spiralling flights, the conspecific chases tended to last longer (Fig. 2). Most chases lasted 2 seconds and no chases lasted longer than 28 seconds. This compares well with Heinrich & Pantle (1975), who noted that chasing flights of *S. ribesii* lasted, on average, slightly longer than 3 seconds. The number and length of the chases depended on the numbers and types of intruders. In the case of the study woods at the observation times, the significant differences between conspecific and heterospecific chases were due to there being more heterospecific intruders than conspecific ones.

The formation of male swarms is traditionally accepted to be a mating-related activity. As such, the swarms would be expected to either act as an attractant to females or to be located in an area through which females are likely to pass (Sullivan, 1981). That said, no females were observed at the leks. The absence of females at leks has been reported in other studies, such as that by Gilbert (1984) in a study on the thermoregulation and swarm structure of *S. ribesii*, who reported that the few females found at a lek were only present very early in the morning. The starting time and duration of swarm formation varies from species to species. The long swarming duration from 0800–2000 h for the empid *E. borealis* (Svensson & Petersson, 1995), and the short swarming duration, starting just before and ending after sunset, for the mosquito *Aedes provocans* (Walker) (Smith & Gadawski, 1994) provide two contrasting examples. It is therefore likely that the observation period and/or frequency were limiting factors in this study and the lack of females in other swarming studies has indeed been ascribed to observation methods (Corbet, 1964; Downes, 1969).

FURTHER WORK

This study took place in a single wood in July and August 2007, during the hours of 0900 to 1600. Comparison with other sites and observations outside these hours and dates could reveal further aspects of behaviour. Virtually all information about swarms is worth recording (Sullivan, 1981), and the study itself raised further questions, such as why are particular locations chosen, what time does swarming start, when do females appear at the leks and how does mating take place? Although no food sources were found at the leks, this does not mean that there was none. Albeit unlikely, aphid honeydew and trapped pollen are suggested possibilities and a thorough search should be undertaken before the assumption is made that leks are not associated with food.

Lek fidelity may also occur. The leks located during this study were in use throughout the study period, with no new leks being established. Lek fidelity is known in some species, such as *E. borealis*, in which successive generations have been reported as using the same lek sites for up to 18 years (Svensson & Petersson, 2000). With lek structure only changing slowly as the wood matures, this may well be the case for *E. balteatus*.

Movement between leks presents a further topic of interest. Individual males may leave to feed and return to the same lek, or they may move to another lek. *Episyrphus balteatus* migrates and has been recorded travelling a distance of more than 100 km in three days (Arrignon *et al.*, 2007). The species is therefore highly mobile and it may be that males patrol a group of leks in the same wood, or even leks in a number of different woods. Undertaking a mark-recapture study as a method of aiding the understanding of woodland lek behaviour is worthy of consideration.

Due to the location of the leks, chases often took place at least partially in poor light. The lack of light, added to the three-dimensional nature of the chases and the

speed of flight, meant that the exact nature of the chases could not be accurately determined. This is a known problem with the observation of flying insects (Sullivan, 1981; Gilbert, 1984) and the only realistic way to accomplish this is by video recording, preferably high-speed, enabling a frame-by-frame analysis. For those suitably equipped, the analysis of contesting and mating flights within syrphid and other dipteran swarms presents a suitable challenge.

Conclusions

Observations of the swarming behaviour of *E. balteatus* were carried out using basic equipment, revealing several interesting aspects of the species' swarming behaviour. Following some analysis, the results suggested several equally interesting directions for further research. The use of basic equipment (just a voice recorder here) for at least the initial observations makes studies of a similar nature within reach of most readers of this Journal. It is hoped that this paper will act as a stimulus to those still just thinking of 'taking the plunge'.

Acknowledgements

The author thanks Jonathon Plowe of the Woodland Trust, for providing the necessary permission to undertake research work in Everdon Stubbs.

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BOOK REVIEW

Living Jewels 2: the Magical Design of Beetles by P. Beckmann. (Prestel Publishing, London, 2007). 112pp. 93 colour photographs. Hard cover £25.00. ISBN 978-3-7913-3777-7.

Paul Beckmann's first collection of larger-than-life colour photographs of exotic beetles published in 2001 was hailed as an artistic success. The second set of photographs is just as stunning with usually one portrait (30cm × 20cm) per page. Some are even larger and span two pages (i.e. larger than A3 format). All the photographs are of the highest quality and have been chosen to achieve the highest visual impact by selecting species with extremely colourful elytra and body markings. The species do not appear to be in any particular taxonomic order, or colour sequence, with the result that turning over every page one is confronted with a kaleidoscope of colour, shape and form different from the preceding. Even as a well-travelled and read entomologist I am amazed at the colour and beauty of these beetles – *Chrysochroa ephippigera* just about takes the biscuit for 'brashness' – bright red and green head, red, green and blue thorax, vivid yellow, red, green and blue elytra, shiny red and green legs and a bright red aedeagus. A jewel indeed. However, I have no idea how big this beetle actually is, or any others in the book, and a simple magnification factor at the bottom of each page, would have been helpful. However, I suspect the author wishes to keep this a secret and wants us to let our imagination fly as we try to visualise these insects in the wild.

I believe he succeeds admirably. He is simply now one of us.

John Badmin

PSYCHE CASTA (PALLAS) (LEPIDOPTERA: PSYCHIDAE) FROM AN ESSEX SALTMARSH: ITS POSSIBLE DIVERGENCE VIA ECOLOGICAL SPECIALISATION FROM INLAND POPULATIONS

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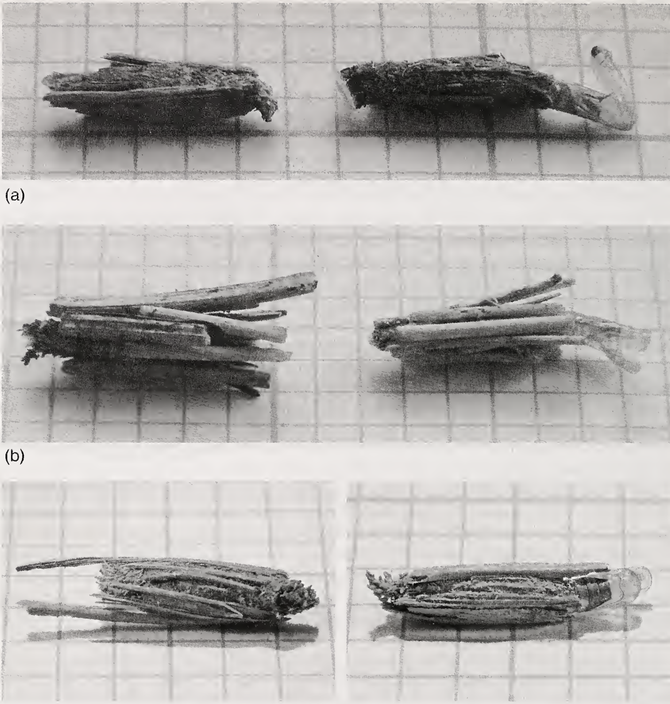
On 3 June 2002 approximately 20 unusually-shaped cases of a psychid were found attached to fence posts on an Essex saltmarsh at South Benfleet. Although these cases were covered with lengths of grass, they did not have the usual appearance of typical larval cases of *Psyche casta* (Pallas). The attached pieces of grass lay parallel with the surface of each case (Fig. 1a), rather than splayed out at the posterior end of the case as is characteristic of *P. casta* from inland sites (Fig. 1b). Most ended short of the posterior end of the case, while in typical *P. casta* they usually project beyond this. Also, the tubular section of the case was thicker and more obvious than with typical *P. casta*, due in part to fewer pieces of grass being attached externally. Consequently, some cases were retained in the hope that they were the saltmarsh psychid *Whittleia retiella* (Newman) (Fig. 1c), a much more local species, and that the female cases contained ova.

On 10 July around 80 larvae of the F_1 generation hatched and formed miniature cases covered with material taken from their parents' cases. These were placed in a Perspex larva box containing a layer of sieved John Innes No. 1 potting compost and provided with dried green oak leaves, moss and fresh and dead lawn grass cuttings (*Poa* sp.) as food. The chances of success in rearing them on these materials was considered low, as *W. retiella* (which they were suspected to be at that time) is stated to feed primarily on the saltmarsh-grass *Puccinellia maritima* (Hättenschwiler, 1985), which was not available in Reading.

The larvae were kept under a natural photoperiod in an unheated room and sprayed lightly with distilled water approximately every fortnight. Surprisingly, they fed up well and by 18 August were in their third instar. Again, their cases appeared unlike those of typical *P. casta*, looking more like miniature versions of their parental cases. Another significant difference noted between rearing these larvae and attempted rearings of *P. casta* in the past was that all the previous *casta* larvae the first author had tried to rear had always died a week or two after hatching. Indeed, *P. casta* had proved to be one of the most difficult species of psychid to rear so far. Not so with these larvae, as by 2 September they were in their fourth instar, with their cases being almost as large as their fully-grown parental cases.

In an attempt to ensure that the larvae did not die over winter, on 25 October 2002, 60 were placed in a large (20 cm diam.) earthenware 'flower-pot'. This contained a layer of potting compost in the base, over-lain with lawn grass cuttings and moss, dry green oak leaves and lengths of dead oak branches covered with lichen and algae. The flower-pot was covered tightly with clear polythene sheet and buried up to its shoulder in the garden. As insurance, ten larvae were retained indoors in a Perspex larva box as described above, as the 'flower-pot method' had not been tried with psychids before and the likely outcome was uncertain.

A very wet and relatively mild winter followed, during which it was feared that mould had killed the larvae overwintering in the garden. However, on 1 February



(a)

(b)

(c)

Fig. 1. (a) F_1 male and female cases of 'saltmarsh' *Psyche casta*, (b) typical male and female cases of inland *Psyche casta*, (c) cases of the saltmarsh specialist *Whittleia retiella*. (All small grid squares = 2 mm.)

2003 the flower-pot was inspected and it was found that most of the larvae had survived the winter, and that their cases still resembled those of the parental generation. During this inspection it was apparent that the overwintering conditions had been very wet, so the flower-pot was placed on a paved patio (north facing) for a few days to dry out. On 22 March the flower-pot was brought indoors and its contents inspected. Several fixed cases were apparent, but many of the larvae were still perambulating. The fixed cases were placed in culture vessels as before, while those that were still mobile were returned to the flower-pot with some fresh grass cuttings and replaced in the garden. This time, to prevent the contents of the flower-pot getting too wet, only the lower one-third of the pot was sunk below ground level.

By 28 March 2003 most of these larvae had fixed their cases to grass cuttings or the wall of the pot.

A total of six of the ten larvae kept indoors over the winter survived to 1 March, their cases still resembling those of their cohorts overwintered out of doors, and of the parental generation. These ten larvae produced two males of typical *P. casta* appearance on 2 April 2003. From the larvae overwintered in the garden, a total of 12 adults emerged between 22 March and 22 April 2003. All were males with the appearance of typical *P. casta*, but their cases resembled those of the parental generation and of their cohorts overwintered indoors. In the wild, such differences in case construction, compared with *P. casta* from inland sites, could be due to environmental factors, e.g. the more exposed conditions of a saltmarsh may result in grass fragments being eroded from the larval cases of both *P. casta* and *W. retiella* in such environments. This does not account for the different case architecture seen with the F_1 generation of these saltmarsh *casta* larvae, as they were reared in protected environments where erosion of case architecture would have been minimal.

As the parental and F_1 larval cases including early instars of saltmarsh *P. casta* were consistently different from the other *P. casta* cases collected from inland sites, it was decided to investigate whether these differences were recognisable at the molecular level, by undertaking DNA analysis of the gene coding for mitochondrial cytochrome b, using the polymerase chain reaction, as the technique was available to the second author. The mitochondrial cytochrome b gene has been used extensively in molecular evolutionary studies and shown to provide phylogenetic information at lower taxonomic levels (Lopez-Vaamonde *et al.*, 2001).

The cytochrome b sequence from one saltmarsh example of *P. casta* was compared with those from three examples of typical inland *P. casta* and showed very little genetic variation (full results in Lopez-Vaamonde & Sims, in prep.). The molecular divergence, identified from pairwise uncorrected distances, was a mere 1.7%. A comparison of inland *P. casta* sequences with the cytochrome b sequence from *W. retiella* reared from cases collected the following year from the same saltmarsh, showed a 17.6% molecular divergence between the two species. It is clear from this that the moths reared from the cases collected in 2002 are *P. casta*.

Despite their genetic similarity, the ease experienced in rearing the saltmarsh *casta* larvae and their consistent differences in case construction and architecture (similar to *W. retiella*, which is confined to saltmarshes) compared with typical inland *casta* cases, suggest that this saltmarsh population of *P. casta* may be undergoing a measure of divergence via ecological specialisation. It would be interesting to know if this form of case construction by *P. casta* is confined to one saltmarsh or occurs more widely in the U.K.

Acknowledgement

The authors wish to thank Mark Harman for taking the photographs used in Figure 1.

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SHORT COMMUNICATION

An unintentional record of the scuttle fly *Spiniphora bergenstammi* (Mik) (Diptera: Phoridae) emerging from *Cepaea nemoralis* (L.) (Gastropoda: Helicidae). – During the 19th May 2007 BENHS field trip to Tywell Hills and Dales Reserve (SP938771) in Northamptonshire (VC32), an empty snail shell was collected from the conifer plantation part of the reserve. This item was taken with a view to trying out a recently obtained copy of the AIDGAP key to Land Snails (Cameron, 2003). The shell was placed in an airtight plastic collecting tube and on returning home was washed, dried with tissue and immediately stored in an airtight plastic box. Approximately two months later, when time was available for identification, it was observed that 17 small flies had emerged. (The intended collection purpose led to the emergence date being unrecorded.) With the aid of Disney (1983), these were all identified as eight male and nine female *S. bergenstammi*. Cameron (2003) was used to identify the shell as *C. nemoralis*. Taking the collection method into account, it was assumed that the shell was not infested between collection and storage.

Previous records show that *S. bergenstammi* has been previously reared from dead *C. nemoralis* and also from dead *C. hortensis* (Müller) and *Helix pomatia* L. (e.g. Robinson & Foote, 1968). Disney (1983) reports that the species has been raised from a blackbird's nest in the U.K. and 'is frequently reported by (UK) public health authorities from improperly washed milk bottles' (presumably less prevalent with the demise of the traditional milkround). *Spiniphora bergenstammi* has also been recorded from domestic pig carcasses, as part of a forensic science experiment (Centeno *et al.*, 2002). These findings indicate that *S. bergenstammi* is a saprophage, preferring, but not limited to, breeding in dead snails.

However, early records (c.1900) suggest that the species could also be a helicid parasite. But these records need confirmation, as similarly early reports state that another *Spiniphora* species *S. excisa* (Becker) has been reared from live-collected helicids *C. hortensis*, *C. nemoralis* and *Helicigona lapicida* (L.) (in Baker 2004, pp.100–101). Later reports (e.g. Robinson & Foote, 1968) also record *C. hortensis* and *C. nemoralis* as *S. excisa* hosts. Disney (1983) uses palp characteristics to separate *S. bergenstammi* and *S. excisa* and the disparity may well result from species misidentification.

This unintentional recording of scuttle fly emergence illustrates a (possibly not commonly known) collection technique that presents an opportunity to extend collective knowledge beyond simply the presence of a particular species. – JOLYON ALDERMAN, 2 Friars Avenue, Delapre, Northampton, Northamptonshire, NN4 8PY. email: jolyon.alderman@btinternet.com

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BODY SIZE AND HABITAT STABILITY – A COMPARISON OF LACEWING (NEUROPTERA: CHRYSOPIDAE AND HEMEROBIIDAE) ASSEMBLAGES FROM DIFFERENT SUCCESSIONAL HABITATS

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Abstract

The consequences of habitat stability on the average body size of species assemblages are complex, with contrasting predictions of both larger and smaller average sizes expected in more stable habitats. These predictions were examined using the body size of four lacewing assemblages from habitats of different successional age in southern Britain. Part of the reasoning supporting both of the predictions was found to be true in that the later seral stages supported some larger species not found in the earlier successional stages, while they also included species smaller than those found the earlier habitats, resulting in the average body size of the assemblages being significantly smaller in the later seral stages. The conclusions thus support the idea that more stable habitats facilitate a greater degree of specialisation.

Introduction

The relationship between body size and ecological interactions has long been recognised (Peters, 1983), but the consequences are still a matter for study and debate (Braun *et al.*, 2004, Lövei & Magura, 2006). One suggestion is that increasing habitat stability permits larger average body sizes (Blake *et al.*, 1994). A contrasting one is that increasing habitat stability leads to increased specialisation and thus a decrease in average body size (Siemann *et al.*, 1999).

During old field succession, habitat stability increases as longer-lived plant assemblages replace shorter-lived ones (Crawley, 1997). The architectural and structural diversity of the plant community increases (Southwood *et al.*, 1979), as does specialisation of the insect herbivore community (Brown & Hyman, 1986). Brown (1982) showed that the diversity of the sizes and shapes of Heteroptera assemblages increased with successional age, noting the relationship between this and the structural diversity of the vegetation. However, since the Heteroptera employ a number of feeding strategies (Southwood & Leston, 1959) caution is needed in interpreting these results in terms of the relationship between habitat stability and size (Lövei & Magura, 2006).

The lacewings (Neuroptera: Chrysopidae and Hemerobiidae) are all predators, both as larvae and adults. They show successional trends in assemblage composition and diversity that appear to be related to structural diversity (Hollier & Belshaw, 1992). A relative uniformity of feeding strategy and of morphology make the lacewings a good candidate group for investigating the relationship between size and habitat stability.

Methods

The lacewings of four sites of known successional age at Silwood Park, Berkshire, UK, were sampled using Malaise traps during 1989. A total of 460 individuals was identified, comprising 22 species (details in Hollier & Belshaw, 1992).

The lacewing species recorded in this study are remarkably similar in general form and thus a single measurement, wingspan, was deemed sufficient to characterise the size of the species. Data were taken from the literature, using several sources for comparison (Frazer, 1959; Aspöck *et al.*, 1980; Semira & Berland, 1988), and the median value of the consensus range calculated. The median values for each species were used to calculate the assemblage means, which were compared using one way ANOVA. To quantify the size range of each assemblage these values were also categorised into five groups (1: <11mm; 2: 11–20mm; 3: 21–30mm; 4: 31–40mm; 5: >40mm) and the diversity of size category for individuals was calculated using the Williams α measure.

Results

Twenty-two species of hemerobiid and chrysopid lacewings were recorded during this survey at Silwood Park (Table 1).

As Fig. 1 shows, the later seral stages supported a wider range of lacewing body sizes than the early ones, whether species or individuals are considered. Notably, smaller as well as larger forms are associated with the scrub and woodland habitats. This is reflected in the size diversity of the assemblages, shown in Table 2, which match the trends seen in species diversity. As can be seen from Fig. 1 and Table 2, the average body size is lower in the assemblages associated with the later successional communities. Notwithstanding the presence of larger forms in these assemblages, this difference is statistically significant ($F=5.899$, $P<0.001$).

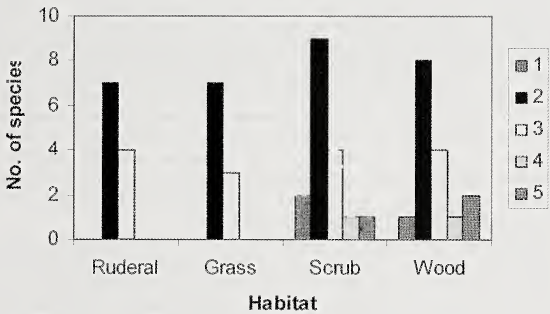
Table 1. The number of lacewings captured in each habitat arranged by species size (smallest to largest) (data from Hollier & Belshaw, 1992; nomenclature follows Plant, 1997).

	Ruderal	Grassland	Scrub	Wood
Sympherobius pygmaeus (Rambur)				1
Sympherobius pellucidus (Walker)			16	5
Micromus variegatus (Fabr.)	1	3	3	
Micromus angulatus (Stephens)	10	6	2	
Hemerobius micans Olivier	3	2	14	17
Hemerobius stigma Stephens	1	11	3	
Hemerobius nitidulus Fabr.		1		
Hemerobius lutescens Fabr.	1		17	2
Hemerobius humulinus L.	6	3	43	9
Micromus paganus (L.)	1		11	1
Wesmaelius subnebulosus (Stephens)	48	11	26	3
Wesmaelius nervosus (Fabr.)			14	23
Hemerobius marginatus Stephens				2
Chrysopidia ciliata (Wesmael)			4	2
Cunctochrysa albolineata (Killington)	3		1	1
Chrysopa perla (L.)	13	16	25	
Dichochrysa flavifrons (Brauer)				2
Chrysoperla carnea (Stephens)	24	11	11	3
Dichochrysa prasina (Burmeister)	1	3		
Dichochrysa ventralis (Curtis)			12	2
Nineta vittata (Wesmael)				4
Nineta flava (Scopoli)			2	1

Table 2. Species and size diversity (Williams α) and average size for the lacewing assemblages of four successional communities.

Community	Ruderal	Grass	Scrub	Wood
Species α	3.0	3.5	4.4	6.0
Size α	0.34	0.40	0.91	1.19
Mean size (mm) and SE	20.8 (0.501)	22.1 (0.821)	18.8 (0.427)	18.4 (0.797)

a



b

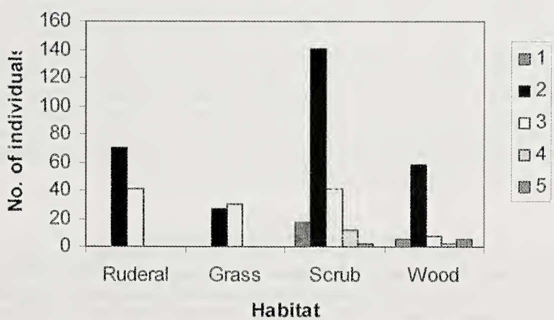


Fig. 1. The number of (a) lacewing species and (b) individuals in each size category (1: <11mm; 2: 11–20mm; 3: 21–30mm; 4: 31–40mm; 5: >40mm) collected by Malaise traps in four successional habitats in southern Britain.

Discussion

Some 48 species of lacewings in the families Hemerobiidae and Chrysopidae are known from Britain, although some of these may not be resident (Plant, 1997). The wingspans range in size from 5mm (*Psectra diptera* (Burmeister)) to 50mm (*Nineta flava* (Scopoli)). The 22 species recorded in this study therefore represent nearly half of the British fauna and include the largest and the second-smallest species (see Table 2). Compared to most groups the body form of the lacewings encountered in this study is remarkably uniform, especially since species that might have complicated these results because of wing polymorphism, such as *Psectra diptera* (Hollier *et al.*, 1997), were not encountered. Since all of the sampled sites are within around 100m of each other, the assemblages recorded represent habitat use rather than the vagaries of the species colonisation potential.

The results show that lacewings, like the Heteroptera studied by Brown (1982), exhibit a greater range in body size in later successional habitats. The effects of habitat stability, and thus resource stability, are probably instrumental in allowing larger forms to occur in these habitats, as postulated by Blake *et al.* (1994). However, the average body size of the assemblages fell as predicted by Siemann *et al.* (1999). This can, as they suggested, be attributed to a wider range of microhabitats being available (Southwood *et al.*, 1979) and thus extra opportunities for specialisation.

In fact, the decrease in average body size seen in the data is probably an underestimate because the smallest lacewings encountered in the study, *Sympherobius pellucidus* (Walker) and *S. pygmaeus* (Rambur), are canopy species and were under-sampled by traps at ground level (Hollier & Belshaw, 1993). The average size of the woodland assemblage is thus an over-estimate.

The usefulness of these data to examine the relationship between body size and habitat depends on the lacewing assemblages being truly associated with the habitats in which they were captured, rather than the ruderal and grassland captures being a subgroup of an essentially woodland fauna. Since the species most abundant in the ruderal and grassland catches were either rare or entirely absent in the woodland catch, and a number of species were at their most abundant in the scrub (Hollier & Belshaw, 1992), this condition is met.

The lacewings are normally regarded as rather generalist predators, taking a range of prey items, but most have specific habitat requirements. Many species seem to be associated with certain types of tree, and some species are predominantly found in the canopy. The extent to which later seral stages support greater specialisation, rather than simply providing more microhabitats and thus potential niches, is thus a rather open question. However, most of the species abundant in the earlier seral stages were also seen in the scrub while some species were restricted to the woodland proper, indicating that the structural diversity of the vegetation is not the only important factor in determining the assemblage composition.

Conclusions

The relationship between body size and habitat stability revealed is complex. On the one hand the range or diversity of sizes increases with increasing stability, and the more stable habitats are able to support larger forms, presumably because these habitats offer a more stable resource base. On the other hand the average size of individuals in the assemblages decreases, as suggested by Siemann *et al.* (1999) rather than increases as suggested by Blake *et al.* (1994). Overall, the results support the notion that average body size decreases as a result of greater potential for specialisation, which in this system is related to the increased structural diversity of the vegetation.

Acknowledgements

Thanks are due to Robert Belshaw who shared the task of running the Malaise traps, to Mike Fitton who also helped with the trapping, Peter Schwendinger who commented on the manuscript and to Val Brown who supervised the work at Imperial College. Special thanks are due to Colin Plant who confirmed or corrected the identifications and provided much useful information.

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SHORT COMMUNICATION

***Lasius flavus* (Fabr.) (Hymenoptera: Formicidae) nesting in heartwood decay in old orchard trees.** – Over the past two summers, worker ants of *Lasius flavus* have been found in loose friable wood mould within the hollowed trunks of old fruit trees within traditional orchards in the Forest of Dean District, West Gloucestershire. The workers are noticeably larger than the average *L. flavus* worker from more typical soil situations. The situation and size raised the possibility that this may have been an unfamiliar species but reference material sent to Cedric Collingwood has been

confirmed as *L. flavus*, albeit unusually large. A species known from equivalent habitat in France or Spain is *L. citrinus* Emery (syn. *affinis* Schenck) but is distinctly different, having longer and thinner funiculus segments but is otherwise similar to *L. flavus* (Collingwood, pers. comm.) The Dean orchards also support large populations of the more usual tree ant, *L. brunneus* (Latreille), but none of this species was noted on the *L. flavus* trees.

The sites are as follows: Pear Tree Farm, Pope's Hill, Littledean (SO681159), 28.ix.2006; Denny Hill, Minsterworth (SO764166), 28.ix.2006; Highcross, Minsterworth (SO789172), 12.ix.2007. Worker ants were found in numbers within the upper layers of the accumulated wood mould about 1m above ground level. Access deeper into the trunks to examine queens has not been possible. Head capsule widths of reference specimens were in the range 0.9–1.0 mm in contrast to reference material from soil nests in Cornwall of 0.7–0.9 mm.

In each case the host tree was plum *Prunus domestica* and the hollowing had been carried out by the decay fungus *Laetiporus sulphureus*, which causes a red- or brown-rot by digesting the cellulose but leaving behind the lignin which crumbles into a fine dust and accumulates in the lower hollow trunk; none was found in apple *Malus* or pear *Pyrus*, although both are used by *L. brunneus*. Apple more typically is hollowed by the white-rot fungus *Inonotus hispidus,* which produces a coarser wood mould; pear is hollowed by *L. sulphureus* but is a much larger tree than plum. Could brown-rot have better thermal properties than white-rot for an ant outside of its normal comfort zone? Does the smaller trunk of plum trees provide a warmer situation than pear?

The main ant texts refer to *L. flavus* as a species of undisturbed grassland (Skinner & Allen, 1996), old pasture and open woodland (Bolton & Collingwood, 1975), old lawns and pastures (Brian, 1977), 'always nesting in the ground, under stones, etc' (Donisthorpe, 1915). The more typical soil mound nests act as solaria (Pontin, 2005) and it is easy to see how the trunk of an open-grown tree can act as substitute, with its vertical faces catching the sun throughout the day. The widespread ant-guest woodlouse *Platyarthrus hoffmannseggi* Brandt was present with the ants in the Highcross tree, and provides the first aerial report of this species too (Harding & Sutton, 1985).

Despite widespread perceptions of *L. flavus* as being a root aphid specialist, the food actually includes a wide range of soil invertebrates including soft-bodied mites, beetle larvae – especially Elateridae, and woodlice (Brian, 1977), and these are in good supply within heartwood decay. Indeed, Collingwood (pers. comm.) suggests the large size of my ants may reflect an unusually high protein diet of beetle grubs.

I would like to record my thanks to Cedric Collingwood and Glenda Orledge for their helpful correspondence. The surveys were commissioned by the People's Trust for Endangered Species as part of their work on noble chafer *Gnorimus nobilis* (L.). –
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KELISIA OCCIRREGA REMANE & GUGLIELMINO (HEMIPTERA: DELPHACIDAE) NEW TO BRITAIN

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ABSTRACT

The planthopper *Kelisia occirrega* Remane & Guglielmino is part of a species complex of very closely related taxa. It has only recently been recognised as showing sufficient distinct morphological differences from *K. irregulata* Haupt, a species so far only known from central Europe, to be ranked as a separate species. Both *K. occirrega* and *K. irregulata* are closely related to *K. vittipennis* (Sahlberg) and only this latter taxon was previously recognised in the British Isles. Although the exact taxonomic status of *K. occirrega* is subject to debate, this taxon can be distinguished relatively easily from *K. vittipennis* (Sahlberg) and appears to be widespread in southern England with records from the Chilterns, North Downs, South Downs, South Wessex Downs and the Isle of Wight. Notes on the diagnosis, distribution and biology of *K. occirrega* are given.

INTRODUCTION

Auchenorrhyncha were monitored over the course of a five year period (1998-2002) on more than 100 sites across southern England as part of a Defra-funded project (BD1414) investigating the enhancement of arthropod diversity on chalk grassland (Masters, 2004). Other taxa identified to species level were Coleoptera and Heteroptera. Sampled sites included unimproved and improved grassland plus arable reversion sites across the Chilterns, North Downs, South Downs, South Wessex Downs and on the Isle of Wight. *Kelisia occirrega* Remane & Guglielmino is one of two new additions to the British list out of 110 Auchenorrhyncha species recorded during this project. *Kelisia occirrega* turned out to be relatively common and widespread on calcareous grassland in southern England. This suggests that it is not a new addition to the British fauna *per se* but may not have been recognised until now due to the difficulties in identification of the often highly similar species belonging to this genus. Currently seven species of *Kelisia* are known to occur in Britain (Le Quesne, 1960; Le Quesne & Payne, 1981).

Prior to the description of *K. occirrega,* specimens belonging to this taxon collected from the UK would probably have been identified with the standard key (Le Quesne, 1960) as *K. vittipennis* (Sahlberg). However, recent studies on the host plants of Auchenorrhyncha in mainland Europe suggest that *K. vittipennis* (Sahlberg) feeds monophagously on *Eriophorum spp*. (cotton grass) and is therefore restricted to wet habitats (Nickel, 2003). It seems likely that most, if not all, previous records of *K. vittipennis* from dry calcareous grassland are thus *K. occirrega.*

In the present study *K. occirrega* was found across southern England, mostly on unimproved chalk grassland with records coming from the following 34 sites (number of individuals in brackets):

Chilterns: Bacombe (SP860073) 27.viii.99, (1); 4.ix.00, (3); 10.ix.01, (3); Bradgers Hill (TL098244) 22.vii.99, (1); 31.viii.99, (1); 27.viii.02, (14); Brush Hill (SP819035) 26' viii.99, (2); 7 viii 00, (6); 7.ix.00, (1); Dunstable Downs (TL007209) 31.viii.99, (4); 08.x.99, (3); 27.viii.02, (45); Dunstable Downs (TL006211) 08.x.99, (1); 27.viii.02, (7); Ivinghoe Hills (SP959168) 28.ix.99, (1); 27.viii.02, (7); Ivinghoe Hills (SP960157)

27.viii.02, (1); Holtspur Bank (SU919904) 27.vii.99, (4); 07.ix.99, (6); 22.vii.02, (3); 28.viii.02, (8); Tyting Farm (TQ026489) 23.vii.02, (1); *North Downs*: Colekitchen Farm (TQ085489) 06.ix.99, (3); 23.vii.02, (3); 29.viii.02, (9); Norbury Park (TQ154541) 08.ix.99, (1); Banstead Downs (TQ257616) 08.ix.99, (5); 22.vii.02, (9); 30.viii.02, (32); Banstead Downs (TQ258615) 08.ix.99, (8); 22.vii.02, (1); 30.viii.02, (23); Trosley Country Park (TQ645612) 02.ix.02, (1); Trosley Country Park (TQ642611) 30.vii.02, (7); 02.ix.02, (1); Whinless (TR294417) 27.vii.99, (6); 8.x.99, (1); 2.viii.00, (1); 14.ix.00, (3); 10.viii.01, (2); 11.ix.01, (4); Creteway Down (TR229380) 21.vii.99, (4); 26.viii.99, (1); 12.x.99, (4); 03.ix.02, (6); Creteway Down (TR236378) 03.ix.02, (1); Great Farthingloe (TR283394) 26.viii.99, (2); Great Farthingloe (TR301403) 21.vii.99, (2); 03.ix.02, (1); *South Downs:* Mill Hill (TQ212073) 17.ix.98, (7); 21.viii.00, (3); 12.ix.00, (8); Holt Valley (TQ314134) 09.x.98, (1); 22.viii.00, (4); 04.x.00, (4); Steep Down, Applesham Farm (TQ 174073) 14.viii.98, (19); 11.ix.00, (1); Winding Bottom (TQ189087) 17.ix.98, (2); 21.viii.00, (8); 12.ix.00, (2); Beddingham Hill (TQ 454062) 24.viii.00, (4); 13.ix.00, (5); *Isle of Wight:* Watcombe Bottom (SZ546774) 25.vii.99, (1); 16.ix.99, (1); 12.ix.02, (2); *South Wessex Downs*: Coombe Bissett Down (SSSI) (SU111247) 31.viii.00, (1); Barnetts Down (SSSI) (SU034263) 27.vii.98, (1); 29.ix.98, (4); 31.viii.00, (6); 12.x.00, (2); Park Bottom (SSSI) (ST800047) 04.ix.00, (1); Gallows Hill (SSSI) (ST949242) 31.vii.98, (6); Fontmell Down (SSSI) (ST880176) 13.vii.00, (1); Knighton Downs (SSSI) (SU061239) 31.viii.00, (2); Cow Down Hill (SSSI) (SY639999) 28.ix.98, (1); 04.ix.00, (2); Hoplands Farm (SU378290) 15.vii.02, (1); 02.ix.02, (15).

One specimen taken from an area of dry limestone grassland in Collyweston near Stamford (Lincs.) 4 ix .987 has also been identified as *K. occirrega* (*leg*. A.A. Cook) indicating that this species is not confined to southern England.

Identification

Using the ‘Handbook for the Identification of British Insects’ by Le Quesne (1960) specimens of *K. occirrega* key out as *K. vittipennis* (Sahlberg) whereas in the recently published volume on the Fulgoromorpha of Central Europe by Holzinger *et al.* (2003) from where *K. occirrega* has not (yet) been found, these would be identified as *K. irregulata* Haupt, a closely related taxon.

Kelisia occirrega has only recently been described as a species distinct from *K. irregulata* Haupt, which it replaces in western Europe with records so far only from Spain and western France (Remane & Guglielmino, 2002). *Kelisia irregulata* is known from France, Switzerland, Germany, Austria and Slovakia (Remane & Guglielmino, 2002).

The main morphological difference between the two taxa lies within the structure of the female ectodermal genitalia. Whereas *K. irregulata* shows a distinct area of bifid sclerotisation at the base of the dorsal wall of the ovipore duct, an area of sclerotisation of that shape is missing in *K. occirrega* (Fig. 1). The subanal appendages in *K. occirrega* are longer than those in *K. irregulata*, extending caudally at least three quarters of the length of the anal tube (Remane & Guglielmino, 2002). Although when raising *K. occirrega* to species rank Remane & Guglielmino (2002) state: “. . . if further research might bring to light the existence of a ‘transitional zone’ with morphologically intermediate specimens indicating hybridisation under natural circumstances between the two morphotaxa, then the western taxon *K. occirrega* would need to be reduced to subspecific rank.” Both taxa are closely related to true *K. vittipennis* (Sahlberg), a widespread Euro-Siberian species in Europe only absent from the Mediterranean (Nast, 1972; Holzinger *et al.*, 2003). According to Holzinger

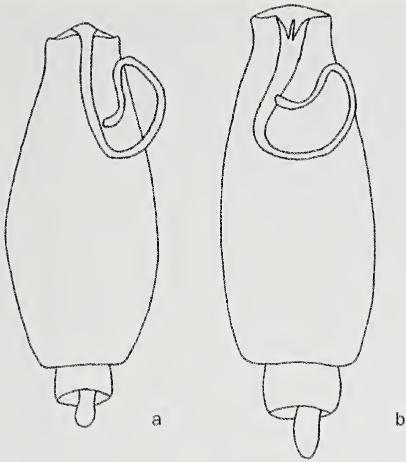

Fig. 1. Dorsal view of ovipore ducts: (a) *Kelisia occirrega* Remane & Guglielmino, (b) *K. irregulata* Haupt (simplified after Remane & Guglielmino, 2002).

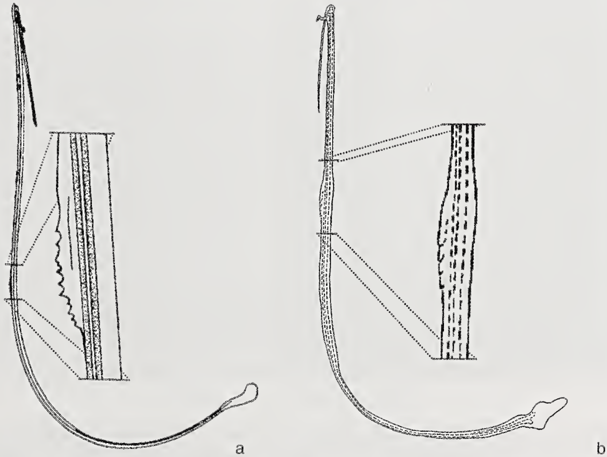

Fig. 2. Lateral view of aedeagus of *Kelisia* species, carina enlarged (a) *K. vittipennis* (Sahlberg) and (b) *K. irregulata* Haupt (drawings adapted from Ossianilsson (1978) and Holzinger *et al.* (2003)).

Fig. 3. Lateral view of aedeagus of *Kelisia occirrega* (specimen collected at Banstead Downs, Surrey, UK on 08.ix.1999).

et al. (2003), *K. vittipennis* and *K. irregulata* can be separated by the shape of their aedeagi. The mid-section of the aedeagus of *K. vittipennis* comprises a carina with 8–10 minute, acute teeth (Figs. 2a and 4c,d). Additional very small spines only visible under a transmission microscope can also occur (Fig. 4c,d). The same carina in *K. irregulata* and *K. occirrega* is only armed with 2–7 blunt lobes (Figs. 2b & 4a,b). The position of the carina along the aedeagal shaft differs between the species and in *K. irregulata* and *K. occirrega* is located more distally compared to that of *K. vittipennis* (Figs. 2 & 3). The thorax of *K. vittipennis* also has dorsolaterally a continous dark sublateral band, which is usually interrupted in *K. irregulata* and *K. occirrega*. Furthermore, the pygophor of *K. vittipennis* in lateral view has a distinctly angular apex, the pygophor of *K. irregulata* has at most the shape of an obtuse lobe (Holzinger *et al.*, 2003).

A summary of the main differences between these closely related species and *K. guttula* (Germar) the only other species of this genus commonly found alongside *K. occirrega* on dry calcareous grassland in southern England, is given in Table 1.

Key to *Kelisia* species of the UK

The intention of the following dichotomous key is to provide a means to separate *K. occirrega* from other species in the genus *Kelisia* occurring in the UK. It has been adapted and simplified from Le Quesne (1960) and restricted to the most distinct characters. It includes *K. irregulata* (not recorded from the UK so far) but excludes similar species of the genus *Anakelisia*.

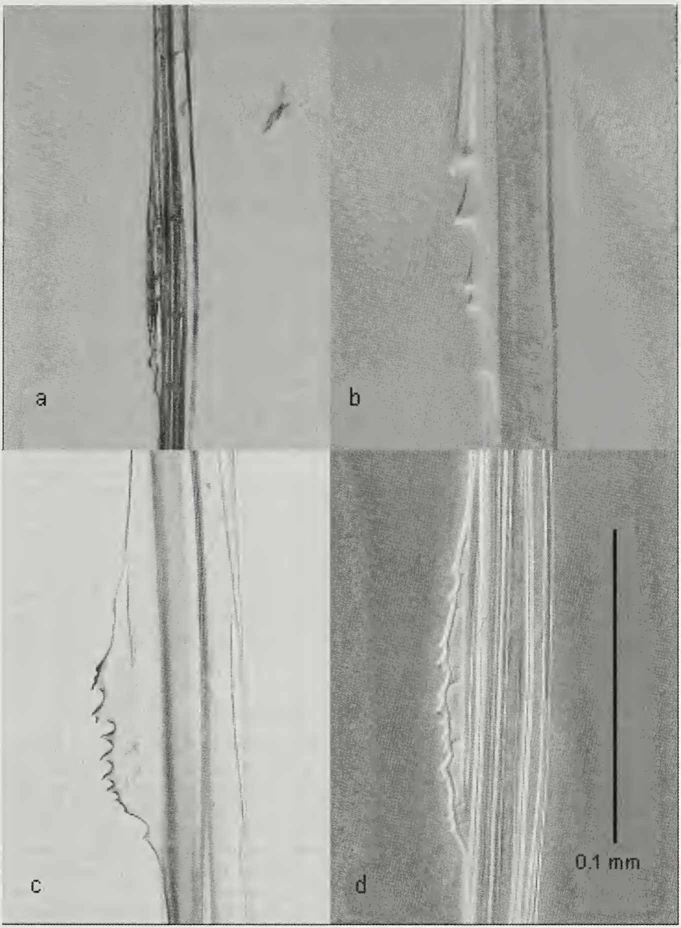

Fig. 4. Aedeagal carina of *Kelisia spp*. (a & b) *K. occirrega*, two specimens collected at Banstead Downs, Surrey, on 30.viii. and 08.ix.1999; (c) *K. vittipennis* collected in Brandenburg, Germany, on 13.viii.2001; (d) *K. vittipennis* collected at Pant-y-Sais NNR, Wales, on 05.viii.2004.

1 Genae without black spot or with a small one remote from frontal margin . 2
– Genae with black spot 3
2 Smaller: overall length, brachypters, 2.5–3.3 mm; macropters, 3.4–3.7 mm . . . . *K. pallidula* (Boheman)
– Larger: overall length: brachypters, 3.6–4.3 mm; macropters, 4.6–5.1 mm . . . . *K. punctulum* (Kirschbaum)
3 Anterior and median tibiae each with two longitudinal black streaks, one along exterior margin and one along interior margin 4
– Anterior and median tibiae without distinct longitudinal black streaks 5
4 Entirely macropterous: length of aedeagus 0.57–0.68 mm; occurring in coastal sand dunes on *Carex arenaria* . . . . *K. sabulicola* Wagner
– Often brachypterous: length of aedeagus 0.68–70 mm; occurring in coastal and peaty marshes . . . . *K. ribauti* Wagner
5 Aedeagus straight . . . . *K. guttulifera* (Kirschbaum)
– Aegeagus elongate, curved strongly at base 6
6 Black spot of genae large, reaching beyond median keel . *K. guttula* (Germar)
– Black spot of genae medium sized, not reaching beyond median keel; sometimes brown beyond median keel 7
7 Dark sublateral stripe on pronotum wide and distinct, not interrupted; pygophor with blunt tooth, appendix hooked; carina projection on stem of aedeagus located in the middle section with 8 to 10 minute sharp teeth . . . . *K. vittipennis* (Sahlberg)
– Dark sublateral stripe on pronotum more or less interrupted; pygophor straight with pointed appendix; laminate projection with a row of blunt lobes and teeth, does not end abruptly; projection located more distally than in *K. vittipennis* 8
8 Male subanal appendages relatively shorter, not reaching caudal three quarters of anal tube length; female ovipore duct at base with distinct bifid sclerotisation . . . . *K. occirrega* Remane & Guglielmino
– Male subanal appendages relatively longer, reaching caudal at least three quarters of anal tube length; base of female ovipore duct without bifid sclerotisation . . . . *K. irregulata* Haupt

Host plants and biology

In southern England, *K. occirrega* is largely confined to chalk grassland on sites with an appreciable amount of *Carex flacca* (glaucous sedge) which, with the very rare exception of *C. montana* (soft-leaved sedge), was the only *Carex* species recorded on the sampled sites. *Kelisia occirrega* was found regularly on unimproved grassland throughout all the studied areas. It was particularly common across the Chilterns and on the North Downs, where it was much more frequent than *K. guttula* (Germar), a closely related species that also feeds on *Carex spp*. On unimproved chalk grassland, *K. occirrega* usually occurred in relatively low numbers, but was occasionally dominant. The species appeared preferentially on ranker sites with a high dominance of *Bromopsis erecta* (upright brome) and/or *Brachypodium pinnatum* (tor-grass). According to the National Vegetation Classification (NVC) these habitats belong to the calcareous grassland communities *Bromus erectus* grassland (CG3), *Brachypodium pinnatum* grassland (CG4) and *Bromus erectus–Brachypodium pinnatum* grassland (CG5). On grazed and managed chalk grassland (e.g. *Festuca ovina-Avenula pratensis* grassland; CG2) *K. occirrega* was generally recorded in low densities. Here it was most frequently found on sites belonging to the NVC sub-

Table 1. Main differences between the four *Kelisia* species dealt with in this paper.

	K. occirrega (Remane & Guglielmino)	*K. irregulata* (Haupt)	*K. vittipennis* (Sahlberg)	*K. guttula* (Germar)
Dark sublateral stripe on pronotum	more or less interrupted	more or less interrupted	wide and distinct, not interrupted	more or less interrupted
Black spot on genae	medium sized, not reaching beyond median keel	medium sized, not reaching beyond median keel; sometimes lighter brown beyond median keel	medium sized, usually not reaching beyond median keel	large, reaching beyond median keel
Pygophor	straight, with pointed appendix	straight, with pointed appendix	curved, with blunt tooth, appendix hooked	straight, with pointed appendix
Aedeagus	carina cuneate, with a row of blunt lobes or teeth; projection located more distally than in *K. vittipennis*	carina cuneate, with a row of blunt lobes or teeth; projection located more distally than in *K. vittipennis*	carina cuneate; located in the mid-section with 8–10 minute sharp teeth	carina about midway along stem ending abruptly in a right angle anteriorly
Sclerotisation at end of female ovipore duct	no bifid sclerotisation at base of the dorsal wall of ovipore duct	distinct bifid sclerotisation at base of the dorsal wall of ovipore duct	minor sclerotisation at end of ovipore duct	minor sclerotisation at end of ovipore duct
Male subanal appendages	appendages longer than in *K. irregulata*, reaching caudal at least three quarters of anal tube length	appendages shorter than in *K. occirrega*, not reaching caudal three quarters of anal tube length		
Food plants	*Carex* spp.	*Carex* spp.	*Eriophorum* spp.	*Carex* spp.

communities CG2a and CG2b characterised by nutrient-poor conditions and occurred on such sites in significantly higher numbers compared to ones belonging to the relatively nutrient-rich CG2c sub-community (Maczey, 2005).

In the UK there are a number of records of *K. vittipennis* from calcareous grassland, even as a dominant species (Morris, 1971, 1973, 1990; Brown *et al.*, 1992; Cook, 1996), which most probably refer to *K. occirrega*. If this is assumed to be correct, then the earlier data on the biology of this species support the results of the present study. The literature also indicates that this planthopper apparently does not occur or only sparingly as an immigrant on intensively grazed calcareous grassland and seems to respond positively to a cessation of intensive grazing (Morris, 1971).

In France and Spain the species has been reported from *Carex* spp. on calcareous soils in open, dry and sunny as well as rather moist conditions (Remane & Guglielmino, 2002). The results of the present study suggest that it feeds mainly on *C. flacca*, which is also the only known host plant of the closely related *K. irregulata* (Nickel & Remane, 2002; Nickel, 2003, Holzinger *et al.*, 2003). However, *K. occirrega* prefers taller swards (on average > 10 cm) irrespective of the possible main host plant *C. flacca*, which tends to occur at higher frequencies in shorter grazed swards (Maczey, 2005). This may also explain why *K. occirrega* occurs frequently in slightly improved, slightly ranker chalk vegetation such as *Arrhenatherum elatius* grassland (MG1). However, it was never recorded from more intensively grazed mesotrophic grassland communities such as MG5, MG6 and MG7.

Acknowledgements

The authors would like to thank Professor Dr. Reinhard Remane (University of Marburg) for his advice on the habitat preferences and biology of *Kelisia* species and his confirmation of some of the British specimens of *K. occirrega* and also Tony Cook (Newton Field Centre, UK) for his help with the identification of specimens from Lincolnshire.

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SHORT COMMUNICATION

Dispersal of Southern Chestnut *Agrochola haematidea* (Duponchel) (Lepidoptera: Noctuidae). – On 14 October 2007 I was astonished to find an example of Southern Chestnut *Agrochola haematidea* in my mv trap at Motcombe, Dorset. This was an exceptionally mild night with south-easterly winds of force 2 to 3 and minimum temperature of 12°C. First recorded as resident in Britain by Professor C. C. Smith in 1990 (*BJENH* **11**: 51) this species has slowly been spreading westwards from the heaths of Sussex through the early nineties reaching the New Forest (Hampshire) in 1996. (*BJENH* **17**: 150, 153).

It appears that the increase in range has been sporadic rather than a gradual one, possibly due to specific habitat requirements forcing a leap-frogging effect. In 1999 Dobson recorded further expansion in the New Forest at a site in Dorset (*BJENH* **13**: 150).

Peter Davey found the moth at Avon Country Park and Hurn in 1998. Within five years its range had drifted further west and north to Ferndown and Verwood which are currently the nearest known sites to Motcombe. The direct distance between these sites and Motcombe is 33 and 27 kms respectively, both lying south to south-east of the capture site.

There is very little suitable heathland habitat between Motcombe and these sites, nor indeed for a very large distance north or west. It seems that when conditions are suitable this species can wander considerable distances, but that such conditions may only arise once or twice a year. Other wandering singletons have been recorded away from heathland in almost identical weather conditions in both 2005 and 2006, coincidently also within 24 hours of my record, on 15 and 14 October, respectively, in locations north and west of the Verwood site and the New Forest area. (Peter Davey pers. comm.). – PAUL BUTTER, 84 Corner Lane, Motcombe, Dorset SP7 9HS

BOOK REVIEWS

British and Irish Butterflies. The complete Identification, Field and Site Guide to Species, Sub-species and Forms by Adrian M. Riley. (Brambleby Books, Luton, Bedfordshire, UK, 2007). 352 pp, 280+ colour figures. Paperback £35.00. ISBN 13:978 0 9553928 0 1.

This is a well written and authoritative review of the British and Irish butterflies, their subspecies and forms. It is clear from the text that the author has spent many hours both in research and on the necessary field work to complete this guide.

The book starts with a welcome from Martin Warren of Butterfly Conservation and a foreword by Richard Harrington. The introduction sets out clearly the aims and objectives and its requirement to be "the most complete guide yet available to each of the 108 butterfly taxa found in these islands". A useful section on how to use the book is followed by a series of 18 photographs showing basic habitats with captions listing the species that might be found in them. A systematic check list gives both the Latin and vernacular names for each species, subspecies and forms.

The text for each species or subspecies is broken down into sections starting with distribution and status, with notes on historic change in distribution, migration and recent records. Other sections cover flight periods, voltinism, larval foodplants, habitat requirements, identification characters, variation and similar species. Where a subspecies has been solely described from the UK or Ireland, information on the original type locality and authority are given. Field tips are provided with details on the best times of day, areas within a habitat and ways to see the species. Finally the accounts give details on regional prime sites broken down to areas i.e. Scotland, Northern England, Central England, Eastern England, South-east England, South-west England, Wales and Ireland. The text is accompanied by good quality photographs taken in the wild. Five appendices list foodplants, useful contacts, flight periods and an index to butterflies found in each geographical region and vice counties of Britain and Ireland. The book concludes with a list of references and further reading and a general index.

The reviewer found the text in the book informative with the diagnostic features for each of the subspecies and forms very useful. However the accompanying photographs, of good quality, proved less convincing in some instances, and it would have been better to have figured the different subspecies of the more variable butterflies next to each other to allow more direct comparisons. Also it was frustrating that some species or subspecies were only represented by photographs of one sex e.g. male *Pararge aegeria tircis* Godart and *P. aegeria insula* Howarth uppersides and a female *Pararge aegeria oblita* Harrison upperside. If the aim is to show diagnostic features then they should either all be shown as one sex or both sexes should be shown. The inclusion of photographs of the day flying moths *Euclidia glyphica* (L.) and *Callistege mi* (Clerck) in the accounts of *Erynnis tages tages* (L.) and *Pyrgus malvae* (L.), respectively should prove particularly useful for the novice butterfly observer. As were the details on the wing pattern differences between females of *Polyommatus coridon* (Poda) and *Polyommatus bellargus* (Rott.).

The nomenclature follows that of Bradley (2000) and so some of the more recent name changes have not been adopted. The author has opted to give each subspecies and form an English vernacular name for the purpose of the book and states that these should always be used in conjunction with the official Latin name when referring to these taxa in the literature. The reasons for using common names in a popular guide book is appreciated, but in the reviewer's opinion is unnecessary and

rather fanciful, as an Orange Tip is an Orange Tip whether it is from Surrey or County Clare without the need to add 'British' or 'Irish' to the front of the name.

Although mention is made of individual variation within the species accounts, some species having noticeably more references than others. Photographs of two major aberrations have been included, which are welcomed by the reviewer and it would have been interesting to see more, though they might be considered superfluous to the main aim of the book. A factual error has crept into these accounts under *Aphantopus hyperantus* (L.), where it is stated that ab. *pallens* Schultz 'is not infrequently found', whereas it is in fact a very rare albino.

The print quality is acceptable with good colour reproduction, though the review copy had some ghost printing on page 288. For a book costing £35 the paper appeared very flimsy and thin and one might expect the pages to become dog-eared relatively quickly if the book is used frequently enough in the field.

In conclusion, the reviewer found the book to be a useful reference guide to British butterflies, particularly the text, and would add this to his library, however it seems most likely that it will be used for the purposes of a tick list by the ever-growing band of butterfly twitchers.

AARON JONES

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Aphids on the World's Herbaceous Plants and Shrubs. Volume 1: Host Lists and Keys. Volume 2: The Aphids. By R. L. Blackman & V. F. Eastop. (Natural History Museum & John Wiley & Sons, Chichester, 2006). 1439pp. Hard covers £225.00. ISBN 0-10-0-471-48973-5.

The events leading to this book originated a quarter of a century ago when the authors first conceived the idea of a crop-orientated identification and information guide to the world's aphids. It seemed a good idea to adopt a world-scale for the book, because the same major crops are grown on all continents, and pest aphids have a canny knack of finding them wherever they are grown. Relatively few aphid species are pests, and those that occur on any one crop tend not to be closely related, so it is possible to compile relatively simple keys for their identification. Thus, *Aphids on the World's Crops* was published in 1984.

The publication also included aphid pests of fruit trees, but did not include aphids on trees grown commercially for their timber. There are several subfamilies of aphids associated with trees, particularly conifers, many species of which are difficult to separate (hence their exclusion first time round). Many aphids are also associated with ornamental trees, and a significant number of crop species exhibit host alternation and migrate to trees for their sexual phase. Despite these complications the authors embarked on a more inclusive book on tree-dwelling aphids, and in the process began to compile accounts that were essentially, if superficially, world revisions of major aphid taxa. *Aphids on the World's Trees* covering 40% of the world's aphid fauna (1760 species) duly appeared in 1994.

So having completed guides to nearly half the world's aphid fauna, the authors began to contemplate whether the remaining 55% or so living on herbaceous plants and shrubs could be treated similarly. The advantages of a complete host plant orientated treatment of the world's aphids – something as yet unavailable for any major group of phytophagous insects – seemed undeniable. The total number of

species in practice reached about 70% of the world aphid fauna because many aphids host-alternate between trees and herbaceous plants. After the first year the authors had not even completed keys to aphids on plant genera beginning with the letter A, having stuck on *Artemisia* (including *Seriphidium* spp., e.g. sea wormwood *S.*(*A.*) *maritima*)) with more than 260 associated species. Both continued to work on the project and gradually built up host plant lists and keys to the main genera. One big impetus to achieving their success was the availability of the Natural History Museum's collection of about 0.6 million microscope slides of aphids, probably the largest and certainly the most comprehensive, well-curated collection of aphid specimens in the world, many contributed by themselves.

Both authors explain that taxonomy strives to name and classify organisms in such a way as to truly reflect their phylogenetic relationships – a fundamental requirement if we are all to understand how organisms have evolved to live and interact with each other. Aphids are prone to showing morphological variation in respect of environmental factors such as host plant, stress, humidity and temperature and seasonally regulated polymorphism. Such is the variation within aphid species that its correct interpretation requires the collection of many specimens, including apterous and alate morphs, and many samples from different localities and seasons. Species in some groups such as the Pemphiginae and Hormaphidinae, and some host-alternating Aphidinae, exhibit completely different morphology on primary and secondary hosts, such that different morphs of the same species have frequently been ascribed to different genera. All these subtle variations in morphology have had to be factored into the keys.

Another contrasting popular view of aphids is that individuals arising from a single clone are identical. For example a single parthenogenetic female wheat aphid can produce millions of asexual offspring under ideal conditions in a single season. Janzen (1971) argues that as the offspring are 'genetically identical', members of that clone are in effect a super-organism, i.e. a single evolutionary individual'. However modern molecular techniques (using microsatellite and mtDNA markers) have shown that contrary to expectation, measurements which might be expected to show a single population mean with no variance, in fact show that aphid clones exhibit significant levels of biochemical variation due to natural background mutation rates (see Loxdale, *Antenna* **31**(3 & 4) for a discussion). It seems that members of the same aphid clone do exhibit variation.

Despite these difficulties, the authors have combined their expert knowledge on aphid biology to construct easily workable keys to aphids found on the world's herbaceous plants and shrubs. To have achieved this feat for the British aphid fauna alone would be considered a major event, but to have compiled an identification guide to aphids feeding on the world's herbaceous plants and shrubs is truly amazing. The two volumes cover accounts for 3120 aphid species in 340 genera feeding on 2150 genera of host plants.

Volume 1 (1024pp), the main workhorse, contains the full set of host plant lists and identification keys to aphids. Generic plant names, listed aphabetically, follow Brummit (1992) and Mabberley (1997) in a similar format to earlier volumes. For each plant genus there is a list of plant species and their known associated aphids, a dichotomous key to aphid species and where necessary, illustrations of critical features such as antennae, thoracic segments and siphunculi. Morphometric parameters such as ANT PT/BASE (the ratio of antennal segment VI base to the flagellar processus terminalis) are frequently used. All characters used are explained in the introduction.

As an example, 18 plant and 20 aphid species are listed under *Aquilegia* (columbines, Ranunculaceae) with a 7-couplet key to aphid identification. By contrast, 138 plant and 260 aphid species are listed under *Artemisia*, necessitating

three separate keys to aphids, each more than 50 couplets long. Luckily, many plant genera have fewer than 10 associated aphid species, and a significant number are fed upon by just a single species. The delight for British entomologists is that if you happen to find an aphid feeding on a particular plant and wish to know what it might be (assuming you know the plant's identity), you can, using this book, quickly locate a shortlist of probable species and a key to their identification. This is just one way of using the plant lists – they can also act as stimuli to finding aphids on closely related plant taxa that are not referred to in the book. The huge scope of this book means that garden plants and newly arrived species in the UK can be studied to good effect (actually anywhere on the planet).

Volume 2 (214pp) contains more detailed information on each aphid species. Aphid taxa are listed in alphabetical order by genera, and by species within genera. For each genus there is a short diagnosis and references to the most recent revisionary accounts. Information on individual species includes appearance in life, range in body size of apterous vivipara, host plant(s), preferred feeding sites, life cycle, chromosome number if known, dates of occurrence and distribution. More detailed site information about the distribution of European aphids can be found at www.faunaeur.org. The book concludes with a list of references, photomicrographs of 252 species illustrating the main genera and an index to species names of aphids.

Worth every pound, even dollars.

JOHN BADMIN

Water Bugs and Water Beetles of Surrey by Jonty Denton. Published by Surrey Wildlife Trust, September 2007. 191pp. Hardcover £15.00 plus £2.40 postage and packing from Surrey Wildlife Trust. ISBN 978 0 9556188 0 2.

A copy of this excellent book is already on order for the Environment Agency freshwater ecology team in Kent where I work. Although our 'patch' extends just into the south-east corner of Surrey (the upper reaches of the River Eden), the book is of much greater value than for its species distribution records alone.

Water Bugs and Water Beetles of Surrey begins with a preface by the author full of infectious enthusiasm for the subject of the book. And Jonty Denton definitely fulfils his aim to 'showcase the beauty, character and behaviour of water beetles and bugs of all sizes and give them the popular treatment they so richly deserve.'

The book is written in a very personable style, with technical information enlivened by historical references (Euclid, Charles Darwin and Hillaire Belloc to name-drop just a few), and by the author's and other collectors' experiences in the field and home.

The distributions of over 340 species are described in the atlas (59 bugs and 283 beetles). This coverage extends beyond the truly aquatic lifestyle to include marginal and semi-aquatic species which 'never get their tarsi wet.' This is one of the reasons that this book will be a great help to my workplace. It will increase our knowledge of those taxa often described as 'Fallen-in-idae'!

There are 31 colour plates of superb photographs including most of the species which can be named from a photograph, and there are representatives of every family described in the book. As well as being beautiful to look at in their own right, the photographs are an excellent teaching aid to back up identification guides which don't necessarily show pictures of whole specimens.

The introductory sections of the book include the biology of water bugs and beetles, and their conservation. The land-use, geology and watercourses of the county are described and the survey area defined.

The main body of the book describes the distribution of water bugs and water beetles in Surrey. Tetrad distribution maps for each species are accompanied by notes which include habitat preferences and rarity status. Records are separated in to pre-1970 and 1970–2007 data sets to allow some time comparison, although a summary of species declining or increasing in Surrey is also included in the introductory text. As well as species notes, each family is described in a précis which includes general notes on biology as well as habitat and rarity.

Although not aiming to be an in-depth text book on the biology of water bugs and water beetles, an amazing range of facts is included, that will appeal both to experienced and budding recorders. For those keen to learn more there are lists of identification guides and relevant organisations. For experts there are recent observations such as the increasing numbers of flying forms of the Saucer Bug *Ilyocoris cimicoides* (L.) which before the last decade was thought to be flightless in Britain. This is most probably explained by colonisation of winged saucer bugs from mainland Europe. The book also suggests other continental species which may turn up in the near future in Surrey.

I recommend this atlas to beetle and bug beginners, experts and Surrey naturalists all!

KATHY FRIEND

The bees of the world. Second Edition by C. D. Michener. (The Johns Hopkins University Press, Baltimore, 2007). 953pp. 60 colour photographs. Hard cover £120.00. ISBN 13-978-0-8018-8573-0.

In this extensive revision of his definitive treatise, Charles D. Michener reveals a diverse world fauna of more than 17,500 bee species. The new edition includes reclassifications, revisions and synonymies covering 1,200 genera and subgenera, some based on molecular characters for the first time.

Gauld & Bolton (1988) among others have advocated placing the sphecoid wasps and the bees into the same superfamily and as a consequence to recognise two major families, the Sphecidae and Apidae *s.l.* This corrects the inconsistency of many previous researchers by removing the need for a more confrontational comparison between bees and wasps. Because a family group name based on the generic name *Apis* antedates a name based on *Sphex* (Michener, 1986), the name of the bee-sphecoid superfamily has been called Apoidea, not Sphecoidea as in most previous works. This is not unreasonable since the bees are more speciose than sphecoid wasps.

The classification encompasses the bee families – Stenotritidae, Colletidae, Andrenidae, Halictidae, Melittidae, Megachilidae and Apidae, and the wasp families Ampulicidae, Sphecidae and Crabonidae.

The book begins with extensive introductory chapters on bee evolution, development and reproduction, anatomy (and anatomical terminology), the co-evolution of bees and flowering plants, nesting behaviour, differences between solitary and social bees, short-tongued versus long-tongued bees, biogeography and biodiversity. Several chapters are devoted to explaining the taxonomic accounts, problematical taxa, and basic keys to families.

The book is largely an account of bee classification and of phylogeny as known to date. All families, subfamilies, tribes, genera and subgenera are characterised by means of keys and brief text comments to aid identification. One major advantage is

that the author has provided numerous references to published keys and papers, so that users can find out where to identify species from their own regions. Aspects of bee biology for each group, especially social and parasitic behaviour, nest architecture, and ecology, including flower associations are also cited. The reader can thus use this book as a guide to the extensive literature on bee biology. Because the male genitalia and associated sterna of bees provide characters useful at all levels, from species to family, and because they are often difficult to describe, numerous illustrations of these are provided as well as references to publications where others are illustrated. The revision also includes references cited in Pesenko & Astafurova (2003) who list many eastern European studies covering the period 1771–2002 (3027 references in all).

The author has produced a new definitive world taxonomic treatise on this large group of insects and is to be congratulated. But how useful is it to field workers in Britain? Earlier this year I was emailed a mobile phone photograph of the black carder bee *Xylocopa violacea* (L.) for identification taken in a garden in Beckenham where the bee appears to have established itself (*Antenna,* **31**(3):136). There are over 100 references to *Xylocopa* in the index, a chapter on the Xylocopini with a 6-page key to subgenera, together with whole insect, thorax, wing and tibial diagrams. There is a very brief biological account describing their primitive nesting behaviour. I suspect one could probably find more directly useful information about the bee's biology on the internet, having learnt the species identity. If you require more information about the Xylocopini as a taxonomic entity, the book wins handsomely.

In some ways the book is for specialists. Those who know a large amount about the British bee fauna, which is fairly restricted in species terms, can dip into this book and find out a lot more about the fauna of their own and adjacent regions and how they relate to the world fauna. The introductory chapters (127pp) are extremely valuable. So if you wish to expand your horizon and learn more about the bee fauna of the world this is the book for you. There isn't another.

John Badmin

Reference

Pesenko, Y.A. & Astafurova, Y.V. 2003. *Annotated Bibliography of Russian and Soviet Publications on the Bees (Hymenoptera: Apoidea; excluding* Apis mellifera*): 1772–2002.* 616 pp. Linz, Austria.

Insect Conservation Biology. Proceedings of the Royal Entomological Society's 23rd Symposium. Edited by A. J. A. Stewart, T. R. New & O. T. Lewis. (CAB International, Wallingford, 2007). 455pp. Hard cover £70.00. ISBN 978-1-84593-254-1.

This book is the very latest in a long line of symposium volumes reviewing entomological themes published by the Royal Entomological Society. The meeting was convened at the University of Sussex in September 2005, with the aim of building upon the Society's previous symposium on this theme, 'The Conservation of Insects and Their Habitats' organised by Nigel Collins and Jeremy Thomas in 1989. The symposium series has proved extremely popular and the volumes remain very useful as reference material on a wide range of insect-related themes. For example the 2003 symposium on Insect Evolutionary Ecology (Fellowes, Holloway & Rolf, 2005) contains many extremely interesting articles including a brilliant one by Francis Gilbert on 'The evolution of imperfect mimicry' which explores evolving mimicry in

European hoverflies and should be read by every aspiring dipterist in this country. Reading this you will look at hoverflies in an entirely new light.

The new volume on insect conservation is more in tune with our members' interests and worth describing in more detail. Three major themes are addressed: The state of insect conservation in major regions of the world and future progress', 'Insects as model organisms in conservation biology' and 'Future directions in insect conservation biology'.

In the opening session Alan Stewart and Tim New review the status of insect conservation in temperate regions of the world. These have benefited from the close attention paid to well-documented faunas by a relatively large number of resident entomologists, particularly in the northern hemisphere. This has allowed species-level conservation programmes to predominate. By contrast Owen Lewis and Yves Basset describe the situation in tropical areas with highly speciose invertebrate faunas, often largely undescribed, necessitating a broader approach to conservation based largely on habitat types. Four different approaches to conservation are then reviewed. Paul Pearce-Kelly and his collaborators describe the benefits of large scale breeding programmes and the re-introduction of endangered species such as the field-cricket *Gryllus campestris* L. in the UK. Martin Warren *et al.* examine the benefits gained by listing species for conservation priority, with particular reference to butterflies as the most thoroughly studied group. Roger Dennis *et al.* emphasise the importance of habitat quality (extent, number, geographical proximity) in conserving species. Michael Samways follows a similar theme by describing the important features at landscape scale necessary for the maintenance of insect populations at a regional level.

The second theme was the examination of insects as model organisms in conservation biology. Melodie McGeoch discusses the important role of insects as 'indicators' of environmental condition and change. Ilkka Hanski and Juha Pöyry review the implications for conservation of species showing metapopulation dynamics in modern fragmented urban and farmed landscapes. The importance of implementing effective long-term monitoring programmes to study species abundance and distribution over time is reviewed by Kelvin Conrad. The central role of insects as 'ecosystem engineers' and providers of ecosystem services is reviewed by Jane Memmott. While most of the threats to insects receiving attention in the past have involved tangible factors such as the loss and fragmentation of habitats, future threats from climate change for example are universal and more difficult to determine (reviewed by Robert Wilson *et al.*). The final chapter of this session by David Thompson *et al.* explores the emerging science of insect conservation genetics, and its roles and applications in effective conservation practice.

The third session looked to the future and how lessons learned might be fostered and developed for the greater benefit of insect conservation worldwide. The chapter by Tim New describes ways in which insects might be elevated to being considered as core components in wider conservation programmes. The chapter by Oliver Cheeseman and Roger Key explores ways in which entomological expertise in conservation is maintained from generation to generation. Claire Kremen and Rebecca Chaplin-Kramer explore the role of insects in ecosystem processes, using pollination as a particular example where economic benefits can be assessed quantitatively. Teja Tscharntke describes ways in which insect biodiversity and conservation of insects can be improved in intensively farmed landscapes. Ways in which GM crops can be used to advantage and the likely implications for beneficial and other non-target organisms are reviewed by Ian Woiwod and Tanja Schuler. Owen Lewis concluded the meeting by providing an overview of the status of insect

conservation and the political hurdles that need to be overcome in many countries in order to achieve lasting success.

This is an important text book for those interested in insect conservation today.

John Badmin

Reference

Fellowes, M. D. E., Holloway, G. J. & Rolff, J. 2005. *Insect Evolutionary Ecology*. Proceedings of the Royal Entomological Society's 22nd Symposium.

Nature Revealed. Selected Writings 1949–2006. by E. O.Wilson. (The Johns Hopkins University Press, Baltimore, 2006). 715pp. Hardcover £23.50. ISBN 0-8018-8329-6.

Two-times Pulitzer winner Edward O.Wilson is one of our foremost biologists and philosophical thinkers of our time. This volume comprises a collection of 61 selected papers and essays written by the author spanning the last 45 years.

As a teenager in the 1940s, the author took a passing interest in minor groups such as birds, fishes and reptiles before settling on insects, for his life's work. Flies amongst others caught his eye, but he soon discovered that to make a collection for further study, it was necessary to use specialised insect pins that were virtually unobtainable during World War II, whereas ants could be preserved in isopropyl alcohol in small prescription bottles available in quantity from the local drug store.

The book is divided into three sections, entitled 'Ants and Sociobiology', 'Biodiversity Studies: Systematics and Biogeography' and 'Conservation and the human condition'. Subjects explored range from the slavery of ants, the genetic basis of societal structure, the discovery of the taxon cycle, the original formulation of the theory of island biogeography, a critique of subspecies as a unit of classification to the conservation of life's diversity. Each article is accompanied by a preface where the author explains the context in which the article was written and how some of the ideas posited then have developed today.

All the papers are worth reading since the author has chosen each one to illustrate a particular point: some may be of interest primarily to myrmecologists, but most have a much wider appeal. The big advantage of buying a compilation of this magnitude is that you have access to a large part of the author's scientific output in original form in a single volume saving months of literature searching time.

It would be churlish to highlight a particular chapter or section for special attention. In the 1960s the author was instrumental with others in formulating the concept of sociobiology as a way of explaining the selection processes involved in complex societal communities such as ants. At the time it was generally perceived that between-group selection, the evolutionary force favouring altruism was invariably weaker than within-group selection, (traits favouring selfishness) and the concept received mixed approval. Since then sociobiology's theoretical foundation has been tested many times and has been gaining ground as a way of explaining group behaviour. It appears that selection can occur at different levels (colonies, castes, individuals) to varying degrees over different timescales. The theory has been applied successfully to many societal processes and has even been used to explain the nature of religion in human societies. Similarly his pioneering studies in other areas of biology have led to concepts such as island biogeography and biodiversity becoming mainstream ideas.

This book is a treasure trove of ideas. It is best used like a dictionary, pulled off the shelf and dipped into from time to time for information on a particular subject. It always rewards. A copy may be found in the Society's library.

J. Stewart

ANNOUNCEMENTS

AN UPDATE ON THE NATIONAL MOTH RECORDING SCHEME

Introduction

The Moths Count project has been running now for over a year. Its aim is to stimulate and encourage moth recording throughout the UK, Isle of Man and Channel Islands, particularly by developing a long-term National Moth Recording Scheme (NMRS) and national database of macro-moth records. The overall ethos of the NMRS is to add extra 'value' to the excellent local recording already taking place, rather than to impose any additional burden upon moth recorders. All County Moth Recorders have been contacted about the NMRS and their responses have been overwhelmingly positive. In Scotland, 24 new County Moth Recorders have been recruited as a result of the NMRS. The updated list of County Moth Recorders can be found on the NMRS page of the Moths Count website (www.mothscount.org).

Achievements in 2007

The Moths Count project had a very busy year in 2007. The headline achievement is that the National Moth Recording Scheme is officially up and running! This is the first time that there has been a national distribution recording scheme covering all macro-moths since the early 1980s. A lot of hard work underlies the creation of the NMRS. As well as developing the network of County Moth Recorders, there has been the installation and rigorous testing of the necessary hardware and software for the NMRS database, and the development and distribution of a short, clear and workable data policy. Hopefully most of you will have seen the latter, if not, it is available on the Moths Count website.

Late in the year, the first records were added to the NMRS database, marking the official start of the scheme. Since then over one million moth records have been incorporated into the database! To ensure that the database grows in a sustainable manner, individual County Moth Recorders are being approached one by one and asked for their local datasets. In addition, we have been working with the Biological Records Centre and Rothamsted Research to make moth records collated under their recording and monitoring schemes available to County Moth Recorders and to the NMRS in due course.

All important feedback and ongoing discussion with the moth recording community was achieved through National Moth Recording Conferences held in England, Scotland, Wales and the Isle of Man during the year. These were very successful with well over 200 moth recorders ranging from beginners to County Moth Recorders, taking part. These conferences provided an important opportunity for moth recorders to meet each other and to hear about other moth projects, local and national, which stem from the collection of moth records. A similar meeting for moth recorders in Northern Ireland is planned for 2008 (date and location to be confirmed), to complete our first set of national conferences.

Twenty-three Moths Count training workshops were undertaken during 2007, from Kent to Northern Ireland. Training was provided for different levels of expertise including; identification of moths by genitalia dissection, training in the

identification and survey techniques for several rare and endangered species and using computers for moth recording, as well as training to provide beginners with a general introduction to moths and moth recording. A total of 322 people attended these free events and feedback was excellent; amongst beginners, 89% said that they now intended to take up moth recording.

Our outreach work also got off to a flying start in 2007, with our first *Garden Moths Count* online survey which is aimed at the gardening public and their families. We also organised 33 public moth events. Almost 700 people attended of whom 33% were children. This is a fantastic result as some of these children may go on to become the moth recorders of the future. All participants took away lots of accessible information about moths and recording and we hope they will go on to attend events organised by local moth groups.

The year ahead – 2008

We have a busy year ahead of us and with continued hard work on the project, we expect 2008 to bring substantial benefits to moth recorders. The NMRS database will continue to grow, both in the total number of records, but more importantly in the geographical coverage, as further county datasets are incorporated. As the dataset increases, we will start to produce provisional distribution maps, so keep your eyes peeled for the first online maps at www.mothscount.org. We will also be working towards the development of an online recording system for future implementation. Towards the end of 2008, we will start putting together a critical species booklet for publication. On top of that we have an expanded programme of training events aimed at moth recorders at all levels of expertise (see website for details). Topics covered in the 2008 training programme include caterpillar survey and identification, rare species (for example the Crimson Underwings, Rannoch Brindled Beauty and Narrow-bordered Bee Hawk-moth), identifying difficult moths, dissection and genitalia determination, use of recording software and media training. All training events are free but places must always be booked in advance.

National Moth Night and day 2008, organised by Moths Count and Atropos will take place on 7 June. It is the tenth anniversary of National Moth Night so an even better excuse than usual for you and your mothing friends to do something special. There has already been a lot of interest in the new idea of a target habitat, orchards, and we hope that the first ever National Moth Night micro-moth target species *Anania funebris* (Ström) will generate important records of this UK BAP priority moth. If we can't guarantee good weather for National Moth Night, we should at least have a chance with *Garden Moths Count* which will be running for two weeks from 21June to 6 July! Additionally another 30 or so public moth events are planned to enthuse and engage the general public. See the Moths Count website for further details of our free training and public events happening near you.

Although you may not have seen much overt progress during 2007, much has been achieved and strong foundations laid for the National Moth Recording Scheme. We are extremely grateful to the dedicated volunteers and enthusiastic moth recorders who are supporting and contributing to this project. Moth recording has never been more popular and there is lots of fantastic work being undertaken by moth recorders and local groups across the UK. With your support and participation, the Moths Count project and, in particular, the National Moth Recording Scheme, will add great extra value to this work and provide useful information and facilities to moth recorders and conservation organisations alike.

Much of the feedback and communication about the Moths Count project and NMRS occurs via a project mailing list. This includes regular email updates. If you would like to join the project mailing list and receive email and/or hard copy information, please contact Sarah-ann Boon (01929 406009 or saboon@butterfly-conservation.org) providing your name, postal address and email address.

ZOE RANDLE & RICHARD FOX,
Butterfly Conservation, Manor Yard, East Lulworth,
Wareham, Dorset BH20 5QP

Moths Count is a partnership of many organisations, individuals and businesses, led by Butterfly Conservation. Principal funders include the Heritage Lottery Fund, British Entomological and Natural History Society, City Bridge Trust, Countryside Council for Wales, Environment Agency, Environment and Heritage Service, Natural England, Royal Entomological Society, RSPB and Scottish Natural Heritage. Many Butterfly Conservation Branches have made generous financial contributions. Many other organisations are involved, providing support and helping to host events.

WILDLIFE SURVEYS IN NATIONAL TRUST GARDENS

The National Trust needs to learn more about the wildlife occurring its 130 formal gardens, attached to historic mansions. Recent surveys of a small sample of gardens discovered four species of invertebrate new to Britain: a Mediterranean whorl snail, a bug on mistletoe, an obscure leaf litter fly and a paper wasp. Also, grassland fungi surveys identified several National Trust lawns as being of national importance, particularly for wax cap fungi. It is likely that many Trust gardens are of importance for rare or declining species, perhaps especially invertebrates (e.g. mining bees and dragonflies). Clearly, it is the resident and regularly visiting species that count, rather than odd vagrants.

Obviously, these places are gardens, rather than nature reserves, but the Trust will do whatever it can to encourage wildlife in its gardens, especially rare species, so long as this does not unduly compromise garden management.

The Trust wishes to hear from naturalists visiting its gardens, particularly specialists in the less widely recorded wildlife groups. Entrance to gardens is free to members. Some care will need to be taken over recording methods, such as using nets publicly and entering garden ponds: do please contact the Trust property in advance should your recording techniques necessitate such disturbance (see NT web site or Members Handbook). Many properties will welcome detailed surveys by specialists and can enable free entrance, including on days when gardens are not open to the public.

Full details of existing survey knowledge, garden by garden, and information for surveyors are on the Trust web site.

See www.nationaltrust.org.uk/wildlifeingardens

Records of interest are welcome via a special email address:
gardenswildlifesurvey@nationaltrust.org.uk

MATTHEW OATES
National Trust, Heelis, Kemble Drive, Swindon SN2 2NA

THE MAITLAND EMMET BENHS RESEARCH FUND

In 2001 the family of the late Lt. Col. Maitland Emmet, a distinguished amateur microlepidopterist, made a generous donation to the Society's Research Fund in his memory As a result the Society has renamed its Research Fund the Maitland Emmet BENHS Research Fund. The Society is very grateful to the Emmet family for their generosity.

The Society invites applications for grants, from the Maitland Emmet Research Fund, to be awarded in December 2008. Awards are open to both members and non-members of the BENHS and will be made to support research on non-marine arthropods, with reference to the British fauna, and with preference given to insects, arachnids, myriapods and isopods. Grants will be given for:

(a) the assistance of fieldwork on non-marine arthropods with relevance to their conservation,
(b) work leading to the production of identification guides and distribution lists, but not the cost of publishing such items.

Travel to examine museum collections and to consult taxonomic specialists would be included. The work and travel is not limited to the British Isles but must have a demonstrable relevance to the British arthropod fauna. Individual grants are unlikely to exceed £500.

Preference will be given to work with a clear final objective (e.g., leading to publication or the production of a habitat management plan). Work on leaf miners and gall forming insects should be submitted to the Society's Professor Hering Memorial Research Fund.

Applicants should send seven copies, if possible, of their plan of work, the precise objectives, the amount for which an award is requested and a brief statement outlining their experience in this area of work, to **Dr J. Muggleton, 17 Chantry Road, Wilton, Salisbury, Wiltshire SP2 0LT**, as soon as possible and **not later than 30 September 2008**. Further information may be obtained from the same address (email: jmuggleton@aol.com).

THE PROFESSOR HERING MEMORIAL RESEARCH FUND

The British Entomological & Natural History Society announces that awards may be made from this Fund for the promotion of entomological research with particular emphasis on:

(a) leaf-miners
(b) Diptera, particularly Tephritidae and Agromyzidae
(c) Lepidoptera, particularly Microlepidoptera
(d) general entomology

in the above order of preference having regard to the suitability of applicants and the plan of work proposed.

Awards may be made to assist travelling and other expenses necessary for fieldwork, for the study of collections, for attendance at conferences, or, exceptionally, for the costs of publication of finished work. In total they are unlikely to exceed £1000 in the year 2009.

Applicants should preferably email, or send six copies, of a statement of their qualifications, of their plan of work, and of the precise objectives and amount for which an award is sought, to **David J. Henshaw, 34 Rounton Road, Waltham Abbey EN9 3AR, UK (djhagro@aol.com)**. The closing date for projects in 2009 is **30 September, 2008**.

Applications are also invited from persons wishing to borrow the Wild M3 Stereomicroscope and fibre optics illuminator bequeathed to the Fund by the late Edward Pelham-Clinton, 10th Duke of Newcastle. Loan of this equipment will be made for a period of up to six months in the first instance.

MEMBERS' EMAIL ADDRESSES

We would like to add email addresses to the Society's membership database. We hope this will speed our communications with you and reduce costs. If you have an email address please email to the Hon. Secretary (jmuggleton@aol.com) and put 'BENHS email' in the subject box. It would help us if you could also indicate whether you would be happy to receive Society notices etc. at this email address.

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY
VOLUME 21, PART 1, MARCH 2008

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